SHAMANIC SNUFFS
or
ENTHEOGENIC ERRHINES

Other Books by Jonathan Ott

HALLUCINOGENIC PLANTS OF NORTH AMERICA
[Wingbow Press, Berkeley, CA, 1976, 1979]

TEONANÁCATL: HALLUCINOGENIC MUSHROOMS OF NORTH AMERICA
Co-edited by Jeremy Bigwood; with A. Hofmann, R.E. Schultes, R.G. Wasson, A.T. Weil
[Madrona Publishers, Seattle, WA, 1978; Swan, El Escorial, España, 1985]

THE CACAHUATL EATER: RUMINATIONS OF AN UNABASHED CHOCOLATE ADDICT
[Natural Products Co., Vashon, WA, 1985]

PERSEPHONE'S QUEST: ENTHEOGENS AND THE ORIGINS OF RELIGION
In collaboration with: R. Gordon Wasson, Stella Kramrisch and Carl A.P. Ruck
[Yale University Press, New Haven, CT, 1986; Fondo de Cultura Económica, México, 1992]

PHARMACOTHEON: ENTHEOGENIC DRUGS, THEIR PLANT SOURCES AND HISTORY
[Natural Products, Kennewick, WA, 1993, 1996; Liebre de Marzo, Barcelona, 1996, 2000]

AYAHUASCA ANALOGUES: PANGÆAN ENTHEOGENS
[Natural Products Co., 1994; Medienxperimente, 1995, 1998; Phantastica, Barcelona, 2001]

THE AGE OF ENTHEOGENS & THE ANGELS' DICTIONARY
[Natural Products Co., Kennewick, WA, 1995]

PHARMACOPHILIA OR THE NATURAL PARADISES
[Natural Products Co., Kennewick, WA, 1997; Phantastica, Barcelona, Catalunya, 1998]

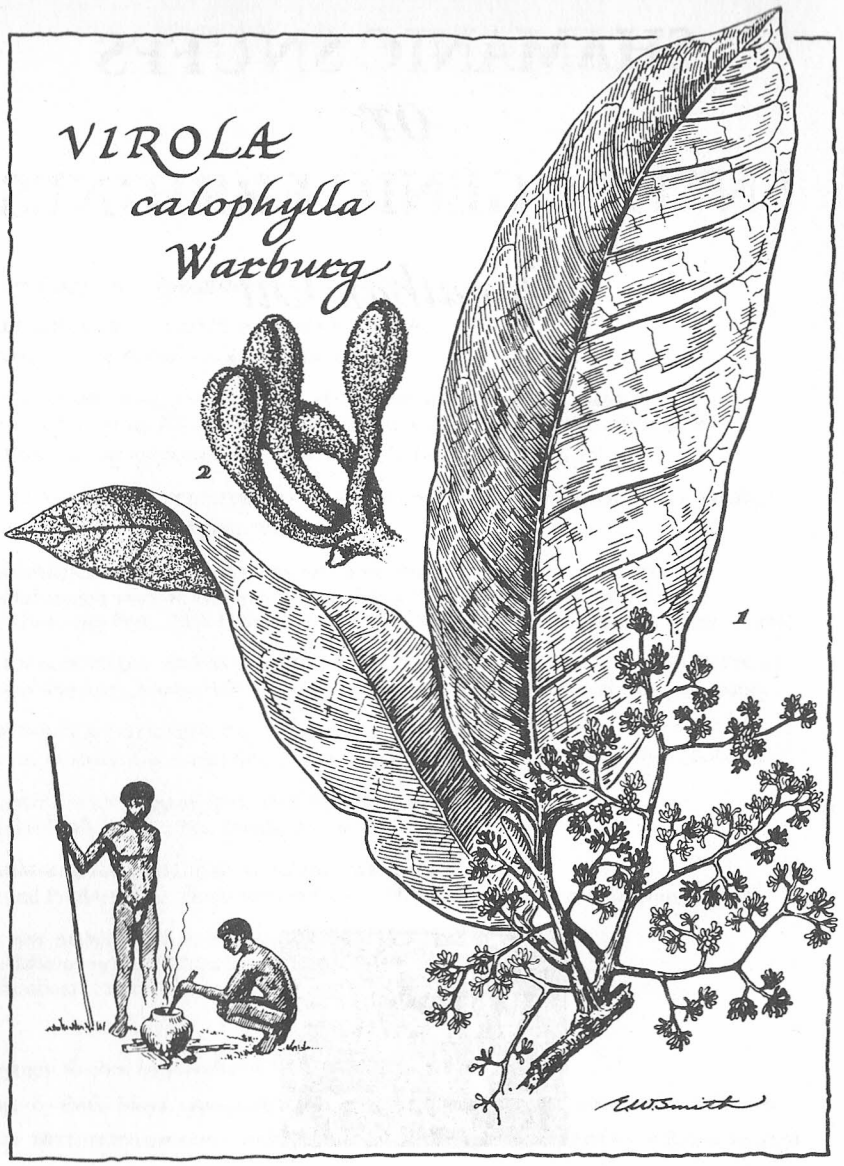
JUST SAY BLOW. COCA AND COCAINE: A SCIENTIFIC BLOWJOB
In collaboration with Christian Rätsch
[Entheobotanica, Solothurn, Schweiz, 2001; AT Verlag, Aarau, Schweiz, 2001]

Design by Pablo Moya, typography by Jonathan Ott, binding by Leonardo Cruz Parcero
Cover: ERYTHROXYLUM COCA, Isidro de Gálvez, Real Expedición Botánica al Reino del Perú
Printed, hand-bound and boxed in México
ISBN 1–888755–02–4 / SFR. 180 / US $100.00
ENTHEOBOTANICA / Kronengasse, 11 / 4502 Solothurn / SCHWEIZ / TEL. 0041 (0)32–621–8949
JONATHAN OTT BOOKS / Post Office Box 1251 / Occidental, Alta California Norte / USA 95465

SHAMANIC SNUFFS
or
ENTHEOGENIC ERRHINES

Jonathan Ott

ENTHEOBOTANICA
SOLOTHURN, SCHWEIZ
2001



Virola calophylla WARBURG [Myristicaceæ], E.W. Smith,
source of the *yá-kee* and *yá-to* visionary snuffs of the
Colombian Vaupés; possibly *hakúduf*^{h}*a* of the Venezuelan Orinoco.

CONTENTS

Dedicated to

BO HOLMSTEDT

Pioneer in shamanic-snuff pharmacognosy and
natural-products chemical analysis

SHAMANIC SNUFFS
or
ENTHEOGENIC ERRHINES

Banisteriopsis caapi (SPR. EX GRISEB.) MORT. [Malpighiaceæ], E.W. Smith, additive to *ñopo-*, *epéna-* and tobacco-snuffs, tobacco-pastes; chewed as cohort to insufflation of *ñopo*-snuff.

INSPIRATION

The Ineffable Inflatus

> Inside this house they have a finely wrought table, round like a scimitar, in which is some powder that they place on the heads of these *zemíes*... then with a cane having two branches that they insert in their nostrils they snuff this powder up. The words they say none of our people understand. With these powders they go crazy and become as though inebriated.
>
> **Cristobal Colón [Columbus]**
> Second Voyage to La Española [1493–1496]

Admiral Columbus himself described a practice of the Taíno Indians of the island of Hispaniola, in which shamans catalyzed their divinatory prowess by snuffing the powdered seeds of *cohoba*, now known to be a species of *Anadenanthera*. This route to inebriation had hitherto been unknown to Europeans; likewise that practice of «swallowing smoke» or smoking, also observed by Colón and his mariners on the Caribbean islands. It was tobacco, *Nicotiana* spp., that the Taíno smoked, although their word *tabaco* (or *taboca*) apparently referred to the snuff-tube through which *cohoba* and possibly *Nicotiana* snuff was taken, *not* to the smoked leaves themselves, and a similar tube may have been used for inhaling smoke, both of *cohoba* and «*tabaco*». In any case, the actual herbs snuffed and smoked received less attention than these curious practices, which in consequence have been confounded. *Cohiba* is still an important trademark for finest Cuban cigars, and it was not until the present century that the Taíno *cohoba*-snuff was shown to derive from seeds of *Anadenanthera*, rather than *Nicotiana* leaves [Reichel-Dolmatoff 1975; Safford 1916; Wassén 1967].

Meanwhile tobacco—*Nicotiana* snuffed, smoked and chewed—had ravenously become the first truly pangæan inebriant, but mists of Mystery enshrouded *cohoba*, within which it remained as abstruse as the day Colón's barkentines landed on La Española 509 years ago. Although smoking is today the definitive mode of tobacco-consumption, in fact tobacco-snuffing enjoyed a fabulous *vogue* for two centuries, and only peaked in 1861 at the outset of the US Civil War—in Sweden and Scandinavia in general, it was not until after World War II that smoked tobacco gained the upper hand. Until sixty years ago, for that nicotian Swede, the *only* tobacco «up to snuff», so to speak, was a fine snuffing-tobacco [Goodman 1993]. Today, in contrast, tobacco-snuffs are all but unknown in some countries, while insufflation of the illicit cocaine is presently definitive of the snuffing-habit, so cast in disrepute thereby (not by *me*, of course, only a pharmacophobe might explain this!). Despite the En-

theogenic Reformation or contemporary *renaissance* in use of shamanic inebriants, the venerable intranasal route has received short shrift, and the scientific literature is rife with misleading—some downright false—«facts» regarding the activity of the snuff-entheogens as errhines (ptarmics), that is, *via* the intranasal route, or snuffing.

This entheogenic *renaissance* has focused ever more on *natural* or plant-based inebriants, and as the sun rises on this 21ST century, Amazonian *ayahuasca*-potions and *anahuasca* or «*ayahuasca-ana*logues» unquestionably rule the roost, although such potions are decidedly *artificial*, the beliefs of the «organophiles» notwithstanding [Ott 1997,1999B]. The key to *aya/anahuasca* is the so-called «*ayahuasca*-effect»—in which tryptamines such as N,N-DIMETHYLTRYPTAMINE (D or DMT) and 5-METHOXY-N,N-DIMETHYLTRYPTAMINE (M, also 5-MEO-DMT), are rendered psychoactive orally by the concomitant administration of MONOAMINE-OXIDASE INHIBITORS (MAOI), such as the β-carbolines from *ayahuasca* (*vide* CHAPTER ONE), which inhibit MAO-metabolism of any tryptamines ingested, to allow their transport to the brain [Ott 1999A]. Leaving aside injection, likewise «smoking» (that is, inhalation of a free-base vapor), the *ayahuasca*-effect has come to be seen as definitive of ingestion of natural tryptamines, but a crucial piece of the psychonautic puzzle has thus been discarded or overlooked.

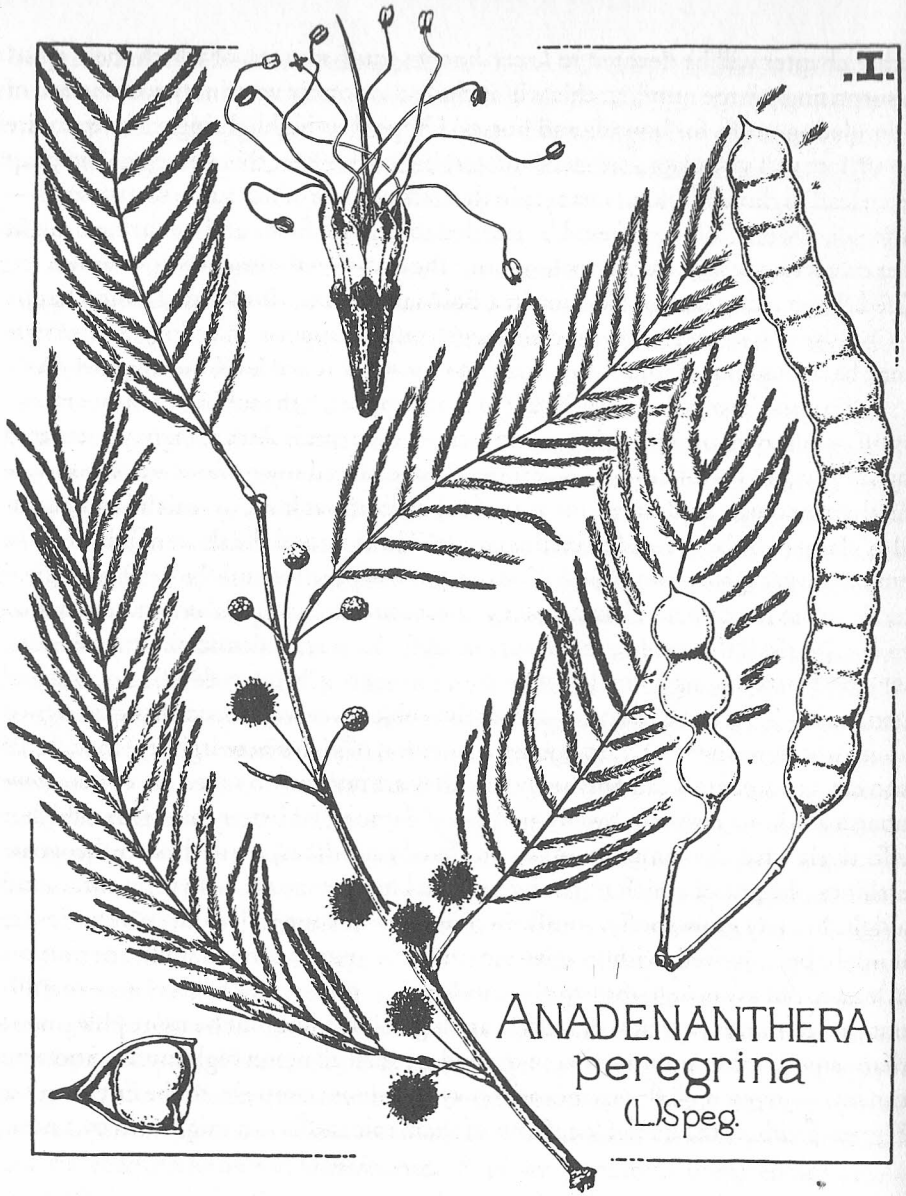
We commonly do not remember that it was in the context of the visionary snuffs, not *ayahuasca*, that Swedish chemists Holmstedt and Lindgren [1967] first proposed the existence of the «*ayahuasca*-effect», which by rights we ought to call the «*paricá*-effect» or «visionary-snuff-effect», and only later was this extrapolated to encompass also *ayahuasca* in its purview. As I commented in my book AYAHUASCA ANALOGUES, nearly three decades passed before their hypothesized tryptamine : β-carboline synergy was put to the test and effectively confirmed in human psychonautic bioassays [Ott 1999A,1999B]. Six years hence, the «ineffable inflatus» (with apologies to Elizabeth Barrett Browning) of shamanic-snuff PSYCHOPTICA continues to be well-nigh trampled underfoot—yea, beaten to snuff—in the resulting *ayahuasca* gold-rush.

This book aims to address this oversight by giving the visionary snuffs pride of place, with barely a nod to *ayahuasca*. I shall commence with a look at the *cohoba/yopo/ñopo*-complex of the Caribbean, including the vast and possibly more important group of *cebíl/hatáj/vilca*-inebriants of the Andes and Chaco (*Anadenanthera* species in the Leguminosæ). Also receiving detailed attention will be some kindred Amazonian snuffs known as *epénalhakúduf^{h}alyá-kee*, principally prepared from species of Myristicaceæ (or the nutmeg-family), mostly belonging to the genus *Virola*.

Given the relative importance of tobacco-snuffing in our own cultural history, and the prominence of similar practices in South American shamanism, it is fitting that I should then turn my attention to this still-widespread indulgence, and yet another chapter will be devoted to lesser-known snuff-sources, of which there exists a surprisingly large number; this will include a visionary veterinary *vademecum* of stimulating snuffs for hounds and horses! I hope thus highlighting such recondite snuff-lore will stimulate a renewed interest in novel «nepenthic nosegays», mayhap even lead to rhonchisonant changes in the lives of some of our suburban mascots—after all, if wo[man]'s best friend be entitled to organic foods and medicines, might her or his two-legged associates long stint the occasional stimulating snoutful? Indeed, I met a dog named Cocaína in a Bolivian prison, who seemed all too happy to indulge «his master's vice», and although «puppy-uppers» and «doggie-downers» may be a laughing matter for us, 'tain't so for subsistence-level hunting peoples!

Of course, it would scarcely be fair of me to approach the subject of the shamanic snuffs whilst religiously keeping my nose clean, so to speak. Accordingly, punctuated by sniting and perfunctory emunctories, I have placed my proboscis at the service of pharmacology, exploiting one area of my anatomy at least, in which I can justifiably claim to be better-endowed than most! The long and the short of it is that I've embarked yet again upon an ambitious program of psychonautic bioassays designed to elucidate the human pharmacology of *cohobalcebíl*, *epénalyá-kee* and other shamanic snuffs. If the results are not «up to snuff» for our academic pharmacologists, who prefer sacrificing animals—when not tormenting helpless convicts or «mental patients»—in some obtusely (or obscenely) «objective» way, to sacrificing a feigned «scientific objectivity» (not to say any affectation of pharmacovirginity) to suchlike snivelly sacraments, I can only reply that they are nothing to sneeze at, either. *Some* pharmacorhinal research, by any analysis, is damned far better than *none*, which is effectively what the competition has proffered us with respect to these entheogenic errhines, the gist of which might be reviewed in that snoach betwixt a sniffle, and a sigh! Ere any grow snuffy, snuffle in disdain, perchance «flye out in a snuffe», as it might be... indeed, wish to «give me snuff» by «beating me to snuff», permit me at least to put my nose to the (snuff-)grindstone... give me but half a chance to sniff-out the sternutatory secrets of snuff! I apologize if my humour be more phlegmatic than sanguine, but promise that in the end we shall all be «in high snuff». And who can say?—in our mellifluous meander, nay, sedulous stampede, to the Entheogenic Elysian Fields... the ineffable inflatus of shamanic snuffs just might win by a nose!

JONATHAN OTT
AMSTERDAM–LA PAZ–SOLOTHURN
SPRING–AUTUMN 1999



Anandenanthera peregrina (L.) SPEGAZZINI [Leguminosæ],
I. Brady, the seeds of which constitute the legendary
cohoba- and *ñopo*-snuffs of the Caribbean and northern South America.

CHAPTER ONE

Cebíl, Cohoba, Ñopo: Anadenanthera Snuffs

> When one is ill they bring the *buhuitihu* to him as a physician. [...] He must purge himself like the sick man; and to purge himself he takes a certain powder, called *cohoba*, inhaling it through the nose, which inebriates them so that they do not know what they do; and in this condition they speak many things, in which they say they are talking to the *zemíes*, and that by them they are informed how the sickness came upon [the patient].
>
> **Ramón Pané**, *Relación acerca de las antigüedades de los indios* [1496]

Friar Ramón Pané of the order of St. Jerome had resided on the island of Hispaniola from the beginning of 1494 until the end of 1498, assigned by Columbus to study the culture of the Taíno-people. Pané learned the Taíno-language and left us a rather detailed account of their use of a seed-based snuff-powder called *cohoba*, shamanic use of which, together with the practice of smoking tobacco, astonished the Spanish invaders, for both of these routes to inebriation were completely unknown to them [Pané 1974; Torres 1998]. The Taíno-culture did not long survive the Conquest, and *cohoba*, which came to be confused with tobacco, might have died with it, had the use of a kindred leguminous seed-based snuff not still flourished in northern South America, where it was generally known as *ñopo* (or *yopo*), *paricá* or *curupá*. Padre José Gumilla described the snuffing of *yupa*, prepared from pods of the tree of the same name, by Otomac Indians in the Venezuelan Orinoco-basin [Gumilla 1741], subsequently Charles Marie de la Condamine mentioned the similar use of *curupá*-snuff by Omagua Indians at the mouth of the Río Napo in Amazonian Perú [de la Condamine 1749]. At the outset of the 19TH century, the German naturalist Alexander von Humboldt navigated the Río Orinoco, and studied the Otomac Indian-use of *ñopo*, described as a powder made from baked cakes of the levigated dough of maniocflour, snail-shell lime, and the broken, fermented pods of a legume that he named *Acacia Niopo* [Reichel-Dolmatoff 1975; Schultes & Hofmann 1980; von Humboldt & Bonpland 1819]. Roughly half a century later, the pioneering British botanist Richard Spruce made a careful study of the use of *ñopo* among the Guahibo Indians of the Colombia–Venezuela Orinoco-basin, supported by ample botanical voucher-specimens and a complete Guahibo-kit of *ñopo*-snuff paraphernalia [Spruce 1908].

Nevertheless, the unfortunate error that Taíno-*cohoba* had simply been tobacco

persisted until 1916, when the Usan ethnobotanist William E. Safford conclusively identified Haitian *cohoba* as *Piptadenia peregrina* (L.) BENTH., today more commonly known as *Anadenanthera peregrina* (L.) SPEGAZZINI var. *peregrina* VON REIS ALTSCHUL, and claimed its identity with the Otomac-*yupa*, the Omagua-*curupá* and the Guahibo-*ñopo*, not to mention a snuff known as *paricá*, reportedly used by the Maué and Mura Indians in Brasil, as snuff and as enema [von Spix & Martius 1831]. Presciently, Safford referred also to *Piptadenia macrocarpa* BENTHAM (= *Anadenanthera colubrina* (VELLOSO) BRENAN var. *Cebil* (GRISEBACH) VON REIS ALTSCHUL) as being «also a source of narcotic [*sic*] snuff», to wit: the *huillca/vilca*, likewise *cebíl/hatáj* of the southern Andean region and the Argentinian Chaco [Safford 1916; von Reis Altschul 1964].

There were also early colonial reports of the use of *vilca* and *cebíl*, at least the latter as a snuff. In 1559, J. Polo de Ondegardo [1916] wrote that the Incans of the south Andean highlands would «invoke the devil and inebriate themselves» for divinatory purposes with an herb called *vilca*, «adding its juice to *chicha* [fermented beverage of maize or another carbohydrate-source] or taking it by another route» [*vide item*: Rätsch 1996c]. Other colonial sources referred to the Incans taking tobacco and *coro* (*vide infra*) as snuffs [Pérez Gollán & Gordillo 1994; Wassén 1967], and it has been assumed that this alternate route was therefore insufflation, although it appears more likely that it was rather as enema or clyster, based on the above statement and another by Felipe Guamán Poma de Ayala. This latter chronicler, however, referred to the taking both by mouth and «below, with a medicine and syringe that they call *uilcachina*», of *bilca tauri* or *vilca tarwi*, thought to be either an *Erythrina* or *Lupinus* species used as a purgative, not *Anadenanthera* [de Lucca & Zalles 1992; Poma de Ayala 1969]. On the other hand, at the southeastern extreme of the Incan sphere, in the province of Tucumán, Argentina, Pedro Sotelo Narváez remarked in 1583 that the Comechingón Indians: «take the *sebil* by the nose, which is a fruit like *vilca*; they powder it and drink it through the nostrils» [Sotelo Narváez 1885]. Finally, the beautifully-elaborated snuff-tablets and accouterments [Torres 1987A,1987B,1993; Wassén 1965,1967], were known in Incan Quechua as *vilcana*, and since there is no question of the identity of *vilca*- and *cebíl*-seeds, the latter having been found in conjunction with the snuff-tablets [Torres *et al.* 1991], it follows that the Incans must likely have snuffed *Anadenanthera* seeds as well [Larrain Barros 1976; von Reis Altschul 1967].

ENTHEOBOTANY OF YOPO / ÑOPO / HISIOMA

As the Taíno-culture did not endure until the modern era of entheobotany, we have only their surviving art and the few colonial sources of information on *cohoba* [Tor-

res 1988,1998; Wassén 1964,1967]. On the other hand, since the pioneering work of von Humboldt and Spruce, there has been considerable field-study on surviving use of *yopo/ñopo*-snuffs, which has been documented in Colombia—where such is decidedly archaic [Torres 1981]—Venezuela, the Guyanas, Brasil, Ecuador and Perú [de Almeida Costa 1970; Granier-Doyeux 1965; Pagés Larraya 1959; Wassén & Holmstedt 1963], although owing to possible confusion with *Virola* and other snuffs, the literature likely gives an exaggerated impression of the range and extent of *Anadenanthera* seed-snuff utilization, both archaic and contemporary [Schultes & Hofmann 1980].

The Orinoco Valley and adjacent areas of Amazônia would appear to be the focus of the *yopo/ñopo* snuff-complex. The Piaroa Indians of southern Venezuela are said to be «avid *yopo* inhalers», although they have to travel to savannah-regions to obtain their seeds, much like the nearby Colombian Makiritaré, Piapoco and Puinave Indians [Wilbert 1958; Wurdack 1958]. Piaroa may add *ayahuasca* (*Banisteriopsis caapi* (SPR. ex GRISEB.) MORT.) stems to *yúwa*- or *yopo*-snuffs, and likewise chew *capí* (or *ayahuasca*) while taking it [Castillo 1997; de Smet & Rivier 1985], also cited for the Pumé of Venezuela, the first group documented to chew the *roots* of *ayahuasca* [Gragson 1997]; while Makiritaré-shamans put roots of *kaahi* (*B. caapi*) and *aiuku* (*Anadenanthera*) in their *maracas* [de Civrieux 1980]. By the same token, the Waiká of Venezuela and Brasil, obtain seeds of *A. peregrina via* trade or pilgrimage [Prance 1972], or else cultivate it near their communal *malocas* or *shapunos*. Known to them as *hisioma* (*sisioma*, *hisiomi*, *hisiomö*) some Waikás greatly prefer their snuffs of *Anadenanthera* seeds to their habitual snuffs from *Virola* trees common in their habitat, as it is considerably stronger and keeps better, leading to cultivation of *A. peregrina* var. *peregrina* near at least some *shapunos* [Brewer-Carias & Steyermark 1976; Chagnon *et al.* 1970,1971; Schultes 1983A]. *Epéna* appears to be a generic Waiká-name for visionary snuffs, although it is more commonly associated with the more abundant (and hence more widely-utilized) *Virola* snuffs. Indeed, sometimes these two types might be taken contemporaneously. Waiká *Virola* and *Anadenanthera epénas* have been mentioned in passing in numerous articles and in a plethora of popular books [Biocca 1996; Chagnon 1968,1992; Donner 1982; Lizot 1985; Plotkin 1993B; Taylor 1979; Yungjohann 1989]. Ordinarily, the Waikás simply powder the toasted *hisioma*-seeds, betimes with addition of ashes, to comminute an *Anadenanthera* seed-*epéna*.

We have contemporary documentation of the Guahibo-preparation and -use of *yopo*, following in the footsteps of that pioneer Richard Spruce. The Cuiva-Guahibo of the Venezuela–Colombia border-region on the Río Kapanaparé make *tortillas* of the dough of crushed *dopa* (*yopo*)-seeds mixed with *waruro*, snail-shell lime, and carefully heat them to dryness. This is rendered into a fine powder and insufflated

via a hollow bone, in doses not exceeding 5 grams [Coppens & Cato-David 1971].

From 1903–1905, Theodor Koch-Grünberg [1909] documented use of a «pungent grey snuff» by the Bará Indians of northwestern Brasil, known as *paricá* and made from dried seeds of a legume he identified as *Mimosa acacioides* [= *A. peregrina*; von Reis Altschul 1964]. The Brasilian Maué Indians and their neighbors, such as the Mura and Kapiruna, also employ *Anadenanthera* snuffs. The Maué's name for the tree as well as snuff is *paricá*, and they might also employ their *paricá* in the form of an enema [de Smet & Rivier 1987; Wassén 1981,1995]. The Mundurucú, neighbors of the Maué, have been reported to use *paricá*-snuff from *Anadenanthera* seeds, but were also said to make a visionary snuff from seeds of *Maquira sclerophylla* (DUCKE) BERG, which is discussed in detail in CHAPTER FOUR [von Reis Altschul 1972]. The Kubeo of northwest Amazônia are reported to employ two types of visionary snuffs [Goldman 1963]. The first, *kúria*, is made from the bark of the *kuri-ákü*-tree, undoubtedly *Virola* [Schultes 1954], but the second, *dúpa*, is made from the *resin* of the *amhókükü*-tree—might this possibly be the resin of *Anadenanthera*? In Andean Bolivia, a poorly-characterized resinous incense is called *zumaque* or *zumuque*—these are Chiriguano- and Callawaya-names for *A. colubrina* var. *Cebil* [de Lucca & Zalles 1992; Oblitas Poblete 1992], the resin of which is still used ethnomedicinally by the Chiquitano of the Bolivian lowlands, who call this tree *nosirr* or by its Tupí-Guaraní-name, *curupaú* [Birk 1995]. Schultes [1954] has also commented on a mysterious, amber resin, called *paricá* in the Colombian Amazon, supposedly from a large forest-tree, once widely used as a shamanic snuff. It is evident that *paricá*, like *epéna*, is a generic rather than a specific name for shamanic snuffs, and both names have been used traditionally for *Anadenanthera*, *Virola* and numerous other snuffs.

Like the Brasilian Maué Indians, the Peruvian Omagua employed *Anadenanthera* preparations both as snuffs and as enemas. The tree itself is known in their Tupí-Guaraní-idiom by the common name *curupá*, and they prepared a snuff of the same name *from its leaves*, which leaf-*curupá* was also administered as a visionary enema; whereas the *seeds* of *curupá* were made into still another snuff, called *paricá* [de la Condamine 1749; von Reis Altschul 1972]. Moreover, a snuff known as *yopa* to the Colombian Chibcha Indians was prepared from *leaves*, possibly of *A. peregrina*, as also the *curupá*-snuff of the Amazonian Cocama Indians which, like its Omaguan homologue, was taken as an enema too; finally, the *paricá*-snuff/enema of Arawakan Ipurina Indians was made from *leaves* [Métraux 1948; von Reis Altschul 1972]. Interestingly, a French traveler documented early in the 19TH century that the Maué made *paricá*-snuff of three ingredients: «seeds of the *acacia angico*» (*angico* is the vulgar Brasilian name for *Anadenanthera* species); «the ashes of a vine» (query: might

this vine not be *Banisteriopsis caapi*?); and «the juice of the leaves of the *abuta*» (the genus *Abuta*, having numerous species used in dart-poisons, includes *A. grandifolia* (MART.) SANDW., known to be an *ayahuasca* «plant-teacher» -admixture [de Lincourt 1854; Luna 1984; Ott 1999B] (*vide* CHAPTERS THREE and FOUR: SHOOTING-UP, and *Tinospora*). There exists at least one collection of archæobotanical snuff-powder from northern Chile, found in association with archaic snuff-tablets and paraphernalia (*vide infra*), which consisted of pulverized *leaves* and not of seeds [Pardal 1937].

There are numerous, many poorly-documented, reports of use of supposititious *yopo*/*Anadenanthera* snuffs among other indigenous peoples, notably the Panoan Kachinahua of the Peruvian Río Purús, the Tuyukas of the northwestern Brasilian Amazon [Pagés Larraya 1959], the Colombian Tarianá and related Arawakan tribes, and the numerous Yekuana-tribes of the Guyana-area. Siri von Reis Altschul [1972] has reviewed and evaluated the many reports which have implicated *Anadenanthera* species in South American visionary snuffs, and her excellent book includes the best bibliography to the subject, botanical, cultural, linguistic, archæological and ethnographic maps, a cross-cultural chart, and chemical and common-name-appendices.

ENTHEOBOTANY OF CEBÍL / HATÁJ / VILCA

Beyond the scanty colonial documentation of the ethnomedicinal importance of *vilca*/*cebíl* (*A. colubrina* var. *Cebil*) in the southern Andes–Chaco-region, numerous archaic art-objects bear witness to its numinous nature and antiquity. From the Peruvian Garagay-site, now encompassed by Lima, dating from 1600–900 B.C., is a well-preserved relief-carving which has been interpreted as representing the characteristic nasal discharge following snuff-use. A similar motif is found at the posterior Chavín de Huántar-site to the north, which dates from 1000–400 B.C. [Burger 1992], and there is a so-called «Chavín-style shamanism textile» from the Ica Valley south of Lima, conjectured to represent both the *San Pedro*-cactus (*Trichocereus pachanoi* BRITT. & ROSE, which contains mescaline, and is also depicted in sculptures at Chavín de Huántar) [Andritzky 1989] and pods of *Anadenanthera* [Cordy-Collins 1982]. Not far from the Ica Valley, at a site called the Paracas Necropolis, there were uncovered exquisite and well-preserved textiles dating from 700–100 B.C., three of which seem clearly also to represent *Anadenanthera* pods. The best-known depicts so-called «flying shamans» who appear to be holding mushrooms in one hand and *Anadenanthera* pods in the other; whereas a similar companion design shows much the same thing, albeit more stylized. The third textile shows dancing shaman/feline transformation-figures, also holding the pods as well as another plant-element, per-

haps with a pair of mushrooms beside one of the shamans [*vide* Reid 1986 for excellent color-reproductions]. The so-called Mochica-pottery, from north of Chavín and around 500 A.D., which also graphically and repeatedly depicts the *San Pedro*-cactus, likewise clearly represents pod-laden *Anadenanthera* trees in relation to *San Pedro* and the deer also associated with *péyotl* (*Lophophora williamsii* (LEM.) COULT.) in México [Furst 1974]. It has been claimed that the Nazca-ceramics from south of the Ica Valley and dating to 100–800 A.D. represent neither *Anadenanthera* nor *coca* (*Erythroxylum coca* LAM.) [Dobkin de Ríos & Cárdenas 1980], which would be surprising if true; whereas a Chimú-textile from the Mochica-area and dating roughly 1000–1460 A.D. seems to me clearly to represent both *coca* and *Anadenanthera* pods on platforms elevating deities associated with deer—pairs of anatomically-detailed and correct *vilca*/*cebíl*-pods flank what appear to be four *coca*-leaves on a rectangular table or cloth [Reid 1986]. What appear to be *cebíl*-pods are also represented naturally on a Peruvian Chancay-style pot, dating from *ca.* 1000–1500 A.D. [González 1988].

Moreover, we have clearcut and incontrovertible archæological, botanical and chemical evidence for the antiquity of ritual use of *vilca*/*cebíl*, both as fumatory and snuff, which has been carefully assembled and analyzed by my friend and colleague C.M. Torres, who has dedicated nearly two decades to this effort. The oldest archæobotanical evidence for entheogen-use in the world comes from the Quebrada de Humahuaca in northwestern Argentina, and consists of puma-bone smoking pipes filled with charred remains of *Anadenanthera* seeds, as well as the seeds themselves, which catalyzed entheognosia in one of our revered ancestors some 4000 years ago! Preliminary analysis of the pipe-material indicated the presence of dimethyltryptamine (*vide infra*), arguably either an *Anadenanthera* seed-constituent or its pyrolysis-product [Fernández Distel 1980]. In the same area there are rupestrian artworks representing anthropomorphic figures smoking these pipes [Schobinger 1997]. Torres has assembled an impressive documentation of the often intricately-carved shell-, whale-bone-, gold-, copper-, stone- and wooden snuff-trays and allied accouterments (which encompass stone-, bone- and gold-snuff-spoons, finely-detailed bone- and wooden snuff-tubes and spatulæ, and well-preserved leathern pokes of the snuff itself, in many cases all enclosed as «kits» in exquisitely-woven *chuspas* such as are used to this day to carry *coca*-leaves), in an unbroken archæological series from the north in the Mochica/Chimú-area at Huaca Prieta, *ca.* 1200 B.C., south to northwestern Argentina, *ca.* 1000–1480 A.D. Geographically, snuff-trays have been found from as far to the northwest as central Colombia to as far south as La Rioja in northwestern Argentina; excepting, of course, both as to the dates and locations, the numerous collections of contemporary snuff-trays of diverse cultures still inhabiting southern

Amazônia [Torres 1987A,1987B,1993,1995,1996A,1996B; Torres & Repke 2000]. The southernmost finds of snuff-trays more or less coincide with the austral extreme of the extent of *Anadenanthera colubrina*, in the Province of Córdoba, just over 30°s latitude [Hunziker 1973]. As if all of this weren't sufficient to convince entheophobic sceptics, with Usan chemist D.B. Repke, Torres then analyzed 1200-year-old snuff-powders from a pair of «kits» found at San Pedro de Atacama in northern Chile—where some 612 such have been excavated, dating between 200–900 A.D.—both of which were shown chemically still to contain the principal *Anadenanthera* visionary tryptamine, bufotenine, plus two of its psychoptic congeners (*vide infra*), whereas identifiable *Anadenanthera* seeds were excavated nearby in the same *stratum* [Torres *et al.* 1991; *vide item* Pochettino *et al.* 1999]; which not merely clinches the case, but along with the findings of the most archaic of the known snuff-tablets in northern Perú, lends considerable weight to the above-cited interpretations of *Anadenanthera* motifs in numerous archaic Peruvian sculptural, textile- and ceramic art-objects.

In the Andean regions of Perú and Bolivia, where such does not seem to survive, we have no ethnobotanical evidence to support the supposititious archaic use of the *vilca*-seeds as shamanic inebriants, nor any solid historical evidence that they were ever used *as snuffs*. As we have seen, the seeds were clearly taken orally in *chichas* and probably also as enemas, whereas at least tobacco and *coro* (*vide* CHAPTERS THREE and FOUR) were taken as snuffs. Nevertheless, it is reasonable to conjecture the existence of a *vilca*-snuff in the Andean *altiplano*, based on the strong ancillary evidence.

In the Chaco of Bolivia, Argentina and Paraguay, however, where Sotelo Narváez had remarked the snuffing of powdered *sebil* by the Comechingón Indians in the era of the conquest, there survives to this day shamanic use of *cebíl* as a fumatory, and at least relict usage of *cebíl* as a snuff, and both practices are rather well attested historically. From many archæological remains, we know that the Olongasta Indians, neighbors of the Comechingón, were also *cebíl*-snuffers, and Jesuit Padre Pedro Lozano wrote, early in the 18TH century, that the Lules of northern Argentina likewise snuffed *cebíl*-seeds [Lozano 1941]. The southernmost extreme of known *cebíl*-use is from the so-called Huarpe-culture which inhabited latitudes to the south of the range of *Anadenanthera*; however, the Allentiac and Millcayac Indians were described in 1703 as «carrying in the mouth» an «herb» called *cibil*, which «alone sustains them for several days» rather like Andean *coca*-use, although the chronicler was disgusted by «a sort of white spume which appears on the lips», making it doubtful he had mistaken *coca* for *cebíl* [de Ovalle 1888]. Farther to the north, and due east of the Comechingón-area, at the confluence of the Río Salado with the Río Paraná, archæological evidence indicates *cebíl* snuff-use by the Diaguita/Calchaquí-culture

[von Reis Altschul 1972], and the Río Salado extending northwest to Salta, together with the Río Paraná/Río Paraguay-system to the north–northeast, demarcate a vast territory in which we find historical and contemporary ethnobotanical documentation of *cebíl* snuff-use. Indeed, during the colonial *encomienda* feudal system, both *cebíl* and *coro* were tributary items in Santiago del Estero, Comechingón/Lule-territory, and the overseers knew well the value of timely gifts of the former to stay in the good graces of their overexploited slaves or serfs [Pérez Gollán & Gordillo 1994].

North of the Calchaquí-area, centered around Corrientes and extending north to Asunción, was the territory of the Abipón Indians, reported in the 18TH century to have «smoked» seeds and pods of *cebíl*, in the manner Herodotus tells us the nomadic Scythians did *Cannabis*: «they would burn the pods or beans that sprout in them, and having closed-up tightly their huts, would inhale their smoke with their mouth, nose and entire body» [Dobritzhoffer 1822]. Farther upriver, where the Río Paraguay demarcates the border between Paraguay and Matto Grosso do Sul, Brasil, the Mbayá Indians reportedly snuffed powdered seeds of *curupá* (*cebíl*) individually, and collectively smoked them [Pagés Larraya 1959]. Much farther north, in the Río Guaporé-area, which marks the border between Bolivia and Rondônia, Brasil, but drains into the Rio Amazonas, not the Paraná, there is good evidence the Brasilian Macurap-tribes, of Tupí-Guaraní-idiom, snuff a mixture of crushed *angico-* (*Anadenanthera*) seeds, tobacco-leaves and bark-ash, while the linguistically-separate Tuparí/Yabutí are said to use a snuff of *cebíl*-seeds, that they call *aimpä-kid*, mixed with a bark-ash also added to tobacco-snuff [von Reis Altschul 1972]. Yet farther north, also in Amazônia, in the Peruvian *montaña*-area (roughly the latitude of Lima and Salvador de Bahia), we find the northernmost extreme of *cebíl* snuff-use, by the Piro Indians, like the Taíno, of Arawakan idiom. Not only did the Piro snuff *cebíl*-seeds, but they were reported also to *eat* them, like the Huarpe at the southern geographic extreme of the *cebíl* culture-range, which extends from about 10° to more than 30° south latitude. Moreover, the Piro were known to administer their *Anadenanthera* snuff to their hunting dogs as well, so to enhance their perceptual abilities [Farabee 1922]! The neighboring Katawishi Indians likewise use an *Anadenanthera* seed-*paricá*, in their case both as snuff and enema, and similarly administer the latter also to their fortunate hunting-dogs [Spruce 1908]! *Vide* CHAPTER FOUR (VISIONARY VETERINARY VADEMECUM) for further details on hunting-enhancing snuffs for hounds.

In the Chaco Central of northern Argentina, between the Río Pilcomayo, which delimits the border with Paraguay, and the Río Bermejo to the south, is where we have the most extensive ethnobotanical documentation of shamanic use of *cebíl*. Some 70 years ago, the shamans of the «Mataco» or Wichi Indians (like «Jívaro» for

Shuar, «Mataco» is a pejorative epithet) were reported to snuff a powder called *ha'tax* prepared from a seed of the same name, and since the French authoress used the verb *priser*, we can assume that the powder was simply snuffed from pinched fingers, *à la mode européenne* (*vide* CHAPTER THREE) [Dijour 1933]. In the following decade, Métraux [1946] reported: «Lule and Mataco shamans snuff a powder made of the seeds of the cebil (*Piptadenia macrocarpa*) [= *A. colubrina* var. *Cebil*] to put themselves in a state of mild trance», also noting widespread use of tobacco, smoked and chewed, but not snuffed, among *chaqueño* Indians, and commented that the Toba and Chunupí «as a substitute for tobacco… chewed or smoked a root called *koropa*», that is of course *coro*, which they did not apparently snuff as in Andean Bolivia (*vide infra* and CHAPTER FOUR). The «Mataco» of Bazán Coronel and Toba-Pilagá are also reported to have used a similar visionary snuff [Pardal 1936,1937]. Califano [1975], Palevecino [1979] and Dasso [1985] offered much greater details on shamanic use of *hatáj* (which is the most widely-used orthography, although *jataj* is common also) by the «Mataco», noting its evident synonymy with *cebíl*. In recent years, there have been a spate of additional reports of Wichi shamanic use of *hatáj*. The Weenhaye[k], who reside upriver in the Bolivian Chaco of Tarija, and formerly were called the Noctén (Mataco), still both smoke and snuff the *hatáj*-powder, in the former case mixed with tobacco, as first reported by Califano [Alvarsson 1995]. Torres published an account of his field-work with German anthropologist C. Rätsch in the General Mosconi-area near Tartagál, which affords the greatest pharmacognostical detail. The roasted *hatáj*-seeds are ground to a coarse powder and snuffed as is, although today the Wichi mainly smoke this (*ñopo* seed-powder was also smoked in the Guyanas [Schomburgk 1848]), usually with tobacco. In that case, powder of 8–10 seeds was mixed with sufficient tobacco for a small «cigar», some half of which might be smoked by the shaman in a given session—effects lasting some two hours. The particular shaman studied harvested his *hatáj* from a tree cultivated beside his home, and seeds are generally harvested in August. The *cebíl*-tree is extremely common and abundant in the Province of Salta, especially around the city of Salta to the southwest [Torres & Repke 1996]. From this research, of which the pharmacological modeling of *hatáj*-snuff in this book is a component, we also have Rätsch's [1996A] psychonautic report of effects of *hatáj*-snuff, and invaluable phytochemical *data*, which will be discussed below. A more recent report [Braunstein 1997] provided valuable ethnographic *data* and photographs of Wichi-rituals, including use of *hatáj*, but *sans* any relevant botanical or pharmacognostical details regarding this.

Moving eastward into the Guaraní-territory of Paraguay and Brasil, there is imprecise evidence for use of visionary *kurupá*-snuff from pulverized seeds of the *kuru-*

payará-tree, clearly *Anadenanthera*. Indeed, this area is richest in botanical diversity for this genus, having both the varieties *Cebil* and *colubrina* VON REIS ALTSCHUL of *A. colubrina*, along with *A. peregrina* var. *falcata* (BENTH.) VON REIS ALTSCHUL [von Reis Altschul 1972]. A sketchy review of Paraguayan indigenous «hallucinogens» in fact refers to three species, attributed to *Piptadenia*: *curupay*, *curupay-curú* and *curupay-rá*, said to be *A. peregrina*, *A. colubrina* var. *Cebil* (as *P. macrocarpa*) and *P. rigida* BENTH., respectively, and to be employed by «Paraguayan Indians in their religious and curative practices» [Costantini 1975]. Bertoni [1927] mentioned that there were various *kurupá*-snuffs known to the Paraguayan Guaraní, alike from «semi-toasted» seeds of *Piptadenia*, which in turn are known generically as *kurupayará*. There is also an intriguing reference to *kurupí*, said to be a species of *Calliandra* with an aphrodisiacal, as opposed to a visionary/shamanic use. Whether these three *curupay*-types mentioned by Costantini correspond to the three varieties of *Anadenanthera* known from Paraguay, include *P. rigida* or a *Calliandra* species—or mayhap *curupay-curú* refers to *coro*/*khuru* (*vide infra*)—can only be answered by further field-research.

The aphrodisiacal *kurupí*/*Calliandra* merits comment, for the obvious linguistic association with the widespread Tupí-Guaraní-name for *Anadenanthera* species and their snuffs, *kurupay* (*curupaí*, *curupaú*, *curupá*). We have also seen that both the Toba and Chunupí smoked and chewed a root called *koro-pa*, which is obviously *coro*, used also by Mocovíes and «Matacos» [Martínez-Crovetto 1968; Serrano 1934]. *Coro*, the inebriant, is roots of *Trichocline* species (Compositæ) discussed in CHAPTER FOUR, which were also snuffed in the Bolivian *altiplano*, and remain smoked to this day in the Gran Chaco, that indeed was known as the «*Coro*-Fields» or the «Elysian Fields» to the Mapuche *coro*-adepts farther south, who made annual *coro*-pilgrimages analogous to the *híkuri*/*péyotl*-pilgrimages of Mesoamerican Huichol Indians [Pérez Gollán & Gordillo 1994; Zardini 1977]. Indeed, the Quechuan name for *coro* would appear to be *khuru*, fairly exalted in a «Callawaya Pharmacopœia» as: «a magic drug whose use confers wondrous curative power», used as a snuff to dissipate headaches and «clarify vision», as well as in the form of root-infusions in wine and liquor, just as has been reported for *coro* in Gran Chaco (*vide* CHAPTER FOUR: *Trichocline*) [Oblitas Poblete 1992]. We have seen that the Incans took their *vilca*-seeds orally, in alcoholic *chichas*, and the Wichi also use infusions of *hatáj* in shamanic initiatory rites [Califano 1975]. *Calliandra calothyrsis* is called *yajé* in Guatemala [von Reis Altschul 1973]; *C. angustifolia* SPR. ex BENTH. is a plant-teacher additive to *ayahuasca* in Perú [Luna 1984], and probabaly contains visionary tryptamines, since the Shuars of Ecuador use some *Calliandra*-bark interchangeably with DMT-rich leaves of *Diplopterys cabrerana* (CUATR.) GATES in *natem*[a] or *ayahuasca* [Ott 1999B], and root-infusions of

C. angustifolia are esteemed as a stimulant by Colombian tribes [Schultes & Raffauf 1990]. Entheobotanical study of *coro* is a *desideratum*, studying the *curupaí*/*khuru*/*coro*-complex in Guaraní-culture will decidedly be a rich vein of shamanic discovery.

Our trail grows rather colder moving northward into the vast Bolivian Chaco, like the Bolivian Amazon of Beni, too little studied ethnobotanically. We have seen that the name *curupaú* is in common usage for *Anadenanthera* in Bolivia, and the Chiriguano-name is *curupaí* [de Lucca & Zalles 1992]. We know that *ayahuasca*-use survives among the Ese'ejas of Perú [Desmarchelier *et al.* 1996], but their Bolivian counterparts of north Beni, the Ese Ejja or Chamán, are apparently unstudied from this perspective. The Ayoreo Indians in the Paraguayan/Bolivian Chaco, of the Zamuco-linguistic family, possess an elaborate shamanic mythology involving neither Leguminosæ nor Compositæ—the only element it seems to have in common with documented shamanic inebriation is the drinking of tobacco-infusions. The primary Ayoreo-inebriant is *sienejna*, *Manihot anomala* POHL subsp. *anomala*; also *caniroja*, *Jatropha grossidentata* PAX & HOFFM., both Euphorbiaceæ. Interestingly, and in both cases, as in *coro*/*khuru*, *the dried roots are smoked*. A psychonautic bioassay smoking 4.5 g of *caniroja* led only to «a slight tranquilizing effect» [Schmeda-Hirschmann 1993]. In Andean Bolivia as in Amazonian Perú, *J. macrantha* M. ARG., or *huarnapo macho*, is a famous aphrodisiac, and «they say that even its smoke has aphrodisiacal properties» [Duke & Vásquez 1994; Oblitas Poblete 1992]; while Texan Indians smoked leaves and bulbs of *J. dioica* CER., «to induce ecstatic vision» [Lipp 1995].

There is at least a citation to the purely symbolic use of two seeds of *willka* or *cebíl* in Andean Bolivian *coca*-leaf divination, arrayed with other items on a *chiwchi misa* (chicken-table), absent any evidence of ingestion [Carter & Mamani 1986], and the seeds, as *vilca* or *vilca vilca*, are openly sold with other common accouterments by street-vendors catering to those who read *coca*-leaves. Moving across Brasil more or less at its broadest point, we encounter perhaps significant references to two species of *Anadenanthera* near the mouth of the Rio São Francisco, which divides the two tiny states of Sergipe and Alagoas at the coast, and inland separates Pernambuco from Bahia. This is territory of the famous *vinho da jurema*, a sort of proto-*ayahuasca* or «liquid snuff», drunk, of simple cold-water infusions of pounded root-bark of *jurema preta*, *Mimosa tenuiflora* (WILLD.) POIR., another leguminous tree superficially like *Anadenanthera*, although having smaller pods and seeds. *Jurema preta* means the «black» *jurema*, of which there are at least II *juremas brancas*, «white» *juremas*, all but one Leguminosæ, species of *Acacia*, *Mimosa*, *Piptadenia* and *Pithecellobium*, largely of obscure shamanic pharmacology. *Jurema* is evidently a Tupí-word, which at least in non-traditional folklore would appear to be the spirit of the plant—she

is represented as a beautiful Indian woman in the forest with a spectral jaguar. There has recently been some research of the badly-degenerated remnants of *jurema*, once widespread over the *caatinga*-region, covering perhaps one-fifth of Brasil, a country which now has precious few indigenous people. In a solid ethnobotanical study of the hybrid Karirí-Shokó Indians near the mouth of the São Francisco, C.N. da Mota [1987,1997] found at least a faint reflection of the sacred aura of *Anadenanthera*. Two species, *angico do campo* and *angico—cebíl* and an unidentified relative—are used ethnomedicinally, mainly for bronchial problems, as extracts of bark and leaves. In the Karirí-system, *angico do campo* is female—like *jurema preta*—whereas *angico* is male, but with a «secret name». Furthermore, as an adjunct to an annual ceremony, parts of which take place in a sacred grove on an island in the river, where there are three *Anadenanthera* trees, «perceived as *trees of great science* or *of great prestige*» (italics in the original) [da Mota & de Barros 1990], a cold-water bark-infusion of *angico* is «taken during the Ouricuri feast, but for spiritual [instead of medicinal; Desmarchelier *et al.* 1999] purposes», and «people gather under [an *angico*-tree] for penance and to perform spiritual «work»». *Angico* is probably *A. colubrina* var. *colubrina*, although this would be at the northernmost extent of its known range, which includes Bahia (var. *Cebil* has been collected from this area, and much farther northward, reaching Fortaleza). It is worth noting that *Anadenanthera* bark-infusions are also used medicinally in the Gran Chaco [Alvarsson 1995, Birk 1995], and that, as we shall soon see, *Anadenanthera* barks in fact contain orally-active visionary tryptamines.

PHYTOCHEMISTRY OF ANADENANTHERA PLANTS AND SNUFFS

Phytochemical study of *Anadenanthera* and snuffs began nearly a half-century ago, with the report by Stromberg [1954] of his isolation, in 0.94% yield, of bufotenine or 5-hydroxy-N,N-dimethyltryptamine [*Merck Index* 12: 1502; *Pharmacotheon* NO. 4; TIHKAL NO. 19 (Ott 1996; Shulgin & Shulgin 1997)] from the seeds of *A. peregrina* (as *Piptadenia* = var. *peregrina*) fresh-collected in Puerto Rico. Stromberg cited Safford's review of *cohoba*, and noted that the seed-pods gave only «a slight positive test» in a crude alkaloid-screening assay. Bufotenine was first isolated as a *minor* constituent of *Bufo* toad-skins and parotoid glands, but here «dimethyl-serotonine» was first found in plants (a year before it'd been found in mushrooms, as *mappine*); it is a positional isomer of psilocine, 4-hydroxy-N,N-dimethyltryptamine, the active principle of psilocybian mushrooms [*Merck Index* 12: 8110; *Pharmacotheon* NO. 38; TIHKAL NO. 18], to be isolated by Hofmann three years thence [Schultes & Hofmann 1980].

The next year, Fish and colleagues [1955,1956] studied seeds and pods of *A. peregrina* (as *Piptadenia* = var. *peregrina*) from Puerto Rico and Brasil and of *A. colubrina* (as *P. macrocarpa*—we can only conjecture which variety) from Brasil and la Florida (the latter cultivated); and seeds merely of *Piptadenia paniculata* BENTH. from Brasil. Excepting *P. paniculata*, «all seed samples gave very strong alkaloid tests», as did the pods from two of the three samples of *peregrina*, and one of the two samples of *colubrina*. The pods of both species contained merely one alkaloid, N,N-DIMETHYLTRYPTAMINE [DMT: *Merck Index* 12: 3311; *Pharmacotheon* NO. 8; TIHKAL NO. 6]; being first definitive evidence for DMT, synthesized in 1931, as natural product, that is, in a plant or animal. In seeds of both species were found bufotenine and N-oxides both of this and DMT, possibly generated from bufotenine and DMT in the manipulation. «Approximately» 1.5–2.0% total alkaloids were estimated for the seed-portion (15% by weight) of a 450 g sample of entire *A. colubrina* seed-pods from Florida; whereas 1.6% alkaloid-concentration was estimated for *A. peregrina* seeds. Raymond-Hamet [1956] may have isolated bufotenine picrate from Fish's *A. peregrina* seed-extract.

In a solid report from Brasil, Alvares Pereira [1957] isolated and purified 13.82 g of bufotenine from 1.25 kg of seeds of *A. peregrina* of unknown provenience (as *Piptadenia*; again, we can only guess which variety), or a yield of 1.10%. Similarly, the group of Pachter [1959] isolated 47 g of bufotenine from 2.26 kg of seeds of *A. colubrina* (as *Piptadenia*; variety obscure), or a yield of 2.1%. The seeds were collected in Rio de Janeiro and the analysis backed by a botanical voucher, so theoretically it can be determined which variety of *colubrina* was involved. Interestingly, this study also saw the first isolation of 5-METHOXY-N,N-DIMETHYLTRYPTAMINE [5-MEO-DMT: *Pharmacotheon* NO. 9; TIHKAL NO. 38], the third in the triumvirate of visionary-snuff tryptamines, as we shall see, from bark of Brasilian *Dictyoloma incanescens* DC., in the Rutaceæ (citrus-) family, the first finding of this known artificial compound as a natural product; and first *proof* of DMT in *Mimosa tenuiflora* (as *M. hostilis* (MART.) BENTH.), root of Brasilian *vinho da jurema*. Accordingly, *Anadenanthera* study led directly to the identification of bufotenine, DMT and 5-MEO-DMT as natural alkaloids of plants.

One year later in Brasil, bufotenine was detected qualitatively in extracts of seeds of *Piptadenia falcata* BENTH., more than likely representing *A. peregrina* var. *falcata*; other unidentified alkaloids were seen in the tests [Giesbrecht 1960]. In a study of five Argentine species of *Piptadenia*, bufotenine and DMT were isolated both from seeds and pods of *A. colubrina* var. *Cebil* (as *P. macrocarpa*—neither the provenience of the samples nor alkaloid-yields were reported), while the N-oxide of bufotenine and «another unidentified 5-hydroxyindole derivative, were detected in the seeds». Bufotenine was isolated also from seeds of *P. excelsa* (GRISEB.) LILLO, albeit «in much lower yield» than from the *cebíl*-seeds, and again its N-oxide was detected in extracts.

From the pods of *P. excelsa*, DMT was isolated as a picrate salt, suggesting a low concentration, and no other alkaloids could be detected. No alkaloids were detected in the seeds of *P. rigida*, neither in the seeds nor the pods of *P. paraguayensis* (BENTH.) LINDM.; likewise neither in mixed seeds and pods of *P. viridiflora* (KUNTH.) BENTH. [Iacobucci & Rúveda 1964]. Also devoid of alkaloids were seeds of *Piptadenia africana* HOOK. F. (= *Piptadeniastrum africanum* (HOOK. F.) BREN., an important African arrow-poison plant, whose bark is used ethnomedicinally much as are *Anadenanthera* barks in South America [Neuwinger 1996]). However, Haitian seeds of *A. peregrina* var. *peregrina* (as *Piptadenia*) were found to contain bufotenine, as well as the oxides both of that and DMT; traces of indoles were detected in the bark [Paris *et al.* 1967]. The same year, bufotenine and DMT were found in seeds of Puerto Rican *A. peregrina* var. *peregrina*, and 5-MEO-DMT and DMT in seeds from Rio Branco (both as *Piptadenia*), on the Brasilian frontier with Bolivia, collected among the Tupari Indians. In both cases, DMT was clearly the *minor* constituent [Holmstedt & Lindgren 1967].

Studying the seed-source of Waiká Indian *hisioma*-snuff, Chagnon and colleagues [1970,1971] isolated 7.4% bufotenine as the only alkaloid, from a source they called *A. peregrina* (surely var. *peregrina*). In indole-metabolism studies of *A. peregrina* (as *Piptadenia*), bufotenine was the major alkaloid both in dormant seeds and during germination, and nine other alkaloids (six possibly tryptamines) were also detected 'though not identified—but DMT and -N-oxide, used as standards, were not present [Fellows & Bell 1971]. Yamasato found bufotenine and DMT in seeds of *A. colubrina*, *A. peregrina*, *Piptadenia contorta* BENTH. and *P. moniliformis* BENTH. [1972]. Schultes' group [1977B] analyzed seeds from Richard Spruce's 1854 collection in Brasil, as well as seeds from two of Schultes' Puerto Rican collections (seedlings and pods of one), and seeds of three other poorly-characterized *Anadenanthera* species collected in the Orinoco in the 1960s. The 120-year-old seeds had only bufotenine, 0.61%, whereas one fresh collection contained bufotenine, DMT and 5-MEO-DMT (80:19:1; no quantitation made); the other DMT, 5-MEO-DMT and bufotenine (75:19:6), 0.21%. When the first of the fresh collections was reanalyzed two years later, it had only bufotenine, 3.52%—regrettably, no reanalysis of their second collection was made, and the authors speculated that over time the two secondary alkaloids could have transformed into other compounds, that is, decomposed—enzymatic transformation into bufotenine in the dormant but live seeds was unlikely, inasmuch as Fellows & Bell [1971] determined DMT was not a probable biosynthetic precursor to bufotenine, nor, logically, should be 5-MEO-DMT. Pods of the second of the fresh collections contained only 0.013% alkaloids, 5-MEO-DMT, DMT and bufotenine (91:8:1); and the seedlings 0.025% with the same profile (95:4:1). Only trace-levels of DMT were found in the

three decade-old seed-collections from the Orinoco, 0.001%, 0.006% and 0.038%; whereas seedlings from the last yielded 0.029% of DMT plus 5-MEO-DMT (96:4). De Smet and Rivier [1987] analyzed a yet-older sample of seeds dating to early 19TH century, collected with elaborate *paricá* snuff-paraphernalia by Johann Natterer from the Brasilian Maué Indians [Wassén 1981,1995]. Once again, simply bufotenine was present, albeit in minuscule amounts—no more than 0.015% could be detected.

Rendón [1984] isolated 0.5% bufotenine from Bolivian seeds of *Anadenanthera colubrina* var. *Cebil* (as *Piptadenia macrocarpa*); and in unpublished research, seeds of *Anadenanthera peregrina* var. *falcata* (as *A. falcata*) were found to contain 4.9% alkaloids, as bufotenine, DMT and 5-MEO-DMT (95.5:3.5:<1); whereas seeds of *P. gonoacantha* (MART.) MACBR. contained 1.2% alkaloids; only DMT and 5-MEO-DMT being identified (53:11.8) [Sávio Nunes *et al.*1987]. Pods of the former had 0.28% alkaloids, (bufotenine, DMT, 5-MEO-DMT: 69.5:24.7:2.1); of the latter 0.70% alkaloids, merely DMT (10.3%) identified. Plant origins are unknown, and no vouchers were cited.

Finally, Torres and Repke [1996] analyzed seeds and seeds plus pods of two collections of *A. colubrina* var. *Cebil* from Salta, Argentina; also *hatáj*-seeds used by their Wichi-shaman, as reviewed above. These *hatáj*-seeds contained an astonishing 12.4% bufotenine; 0.57% N-methylserotonine [5-HO-NMT; TIHKAL NO. 19]; 0.06% DMT! The Salta-collections had only bufotenine—the first 4.41%; second 3.51%; whereas pods of the latter had trace-amounts of bufotenine and DMT, 0.05% each.

Inasmuch as leaves and barks of *Anadenanthera* are used ethnomedicinally, and could be involved in some snuffs or oral preparations, a brief review of tryptamine-content of these is in order before proceeding to the phytochemistry of the snuffs themselves. We have merely three reports which give analyses of leaves, and nine of barks. Stromberg [1954] found leaves alkaloid-negative in a crude spot-test; Agurell's group [1969] found 0.013% alkaloids in leaves from Brasil, as DMT and 5-MEO-DMT (49:48); Schultes' study [1977B] found 0.11% alkaloids in a fresh Puerto Rican collection, as 5-MEO-DMT and DMT (88:12), while an older Brasilian collection had only 0.013% alkaloids, DMT and 5-MEO-DMT (49:48)—leaves in every case from *A. peregrina* var. *peregrina*. As for stem-bark, Stromberg [1954] also found it to be negative for alkaloids in a spot-test. Legler and Tschesche [1963] isolated «relatively high amounts» of 5-MEO-DMT and monomethyl and desmethyl homologues (5-MEO-NMT and 5-MEO-T [Mexamine; TIHKAL NOS. 42,35]) from bark of *A. peregrina*, seemingly in that order of concentration. Iaccobucci and Rúveda [1964] isolated 0.01% 5-MEO-NMT from *A. colubrina* var. *Cebil* bark; Paris' group [1967] found traces, apparently of bufotenine and the N-oxides of it and DMT, in bark of *A. peregrina* var. *peregrina*. Holmstedt & Lindgren [1967], in var. *peregrina* bark from Colombia, found mostly

5-MeO-DMT, with DMT, 5-MeO-NMT and NMT [TIHKAL NO. 50]; Agurell's [1969] Brasilian var. *peregrina* bark gave 0.042% alkaloids, mostly 5-MeO-DMT and 5-MeO-NMT (59:36), with only traces of DMT and bufotenine. The Schultes group [1977B] found 0.41% alkaloids in fresh Puerto Rican var. *peregrina* bark, as 5-MeO-DMT and DMT (95:5); merely 0.042% in much older Brasilian bark, as 5-MeO-DMT plus 5-MeO-NMT and scant traces of DMT (59:36:1). The roots of the former had 0.70% alkaloids, as 5-MeO-DMT, DMT and bufotenine (97:2:1). Sávio Nunes and colleagues [1987] found 1.6% alkaloids in bark of *A. peregrina* var. *falcata*, of which 56.5% was 5-MeO-DMT, the only one identified, and 0.2% alkaloids in bark of *Piptadenia gonoacantha*, partly as 5-MeO-DMT and DMT (36.1:2.7). Most recently, Torres and Repke [1996] found merely traces of DMT and bufotenine in bark of *A. colubrina* var. *Cebil* from Salta.

Analyses of actual *Anadenanthera* snuffs, alas, are meager, and seldom has fresh material been studied *in situ*. As we shall see in CHAPTER FIVE, the situation is even worse with regard to their pharmacology, or at least that *was* the case. The first published study of *Anadenanthera* snuffs was by the group of Fish [1955,1956], as it happens, in a US-government laboratory at National Institutes of Health (my, how times have changed!). In all, five snuff-samples were studied: 1) Venezuelan Piaroa Indian-snuff, 1949; 2) «*Piptadenia* snuff from Llanos area of Colombia»; 3) seeds roasted 40 minutes at 175,° then ground (probably fresh Puerto Rican collections of *A. peregrina* var. *peregrina* also analyzed; *vide supra*); 4) the same, but with calcium carbonate added prior to roasting; and 5) ground seeds first fermented in emulation of the Otomac-Indian *ñopo* (these last three thus «NIH-snuffs»). Qualitative analysis showed presence of «large quantities» of bufotenine in every case, perhaps twice as high in the NIH-snuffs as in the Piaroa-sample, which showed traces of two alkaloids not found in NIH-snuff. Italian scientists analyzed a supposititious sample of Venezuelan *ñopo*-snuff, but saw only curarine-type dart-poison alkaloids, suggesting some mixing of samples [Stagno d'Alcontres & Cuzzocrea 1957]. Another Italian group [Marini-Bettòlo *et al.* 1964] found bufotenine, DMT (and their N-oxides) in a «seed-*epéna*» of a Waiká tribal group from the Río Mavaca. Holmstedt & Lindgren [1967], *sans* botanical sources, reported analyses of two evidently *Anadenanthera* snuffs: a Piaroa *paricá*-snuff collected in Venezuela in 1955, and a *yopo*-snuff collected in Colombia in 1956. The *yopo*-sample contained principally bufotenine, with lesser amounts of DMT and 5-MeO-DMT, while the Piaroa-*paricá* had roughly equivalent amounts of bufotenine and DMT, almost no 5-MeO-DMT, and significant amounts of harmine [*Merck Index* 12: 4647; *Pharmacotheon* NO. 18; TIHKAL NO. 14]. We have seen that the Piaroa, like the Guahibo, chew *ayahuasca*-stems as an adjunct to taking *Anadenanthera* snuffs, and it is evident *ayahuasca* may at times also be added to some

snuffs, as their content of harmine suggests. A Surára *epéna*-snuff, also analyzed by Holmstedt and Lindgren and previously by Bernauer [1964], showed none of these tryptamines, just harmine and (+)-1,2,3,4-TetraHydroHarmine (THH or *d*-leptaflorine) [*Pharmacotheon* NO. 19; TIHKAL NO. 54], and scant traces of harmaline [*Merck Index* 12: 4644; *Pharmacotheon* NO. 17; TIHKAL NO. 13], all being signature-alkaloids for *Banisteriopsis caapi*, especially the comparatively-rare harmaline. Bernauer reported 0.38% harmine plus 0.08% THH in the 1956 collection from Brasil. De Smet and Rivier [1985] analyzed two Piaroa Indian *yopo*-snuffs from Venezuela, both from collections and not fresh. One sample contained 1.0% bufotenine, the second less than 0.1% bufotenine plus «a trace of harmine». Moreover, harmine, harmaline and THH, known generically as β-carbolines, were likewise isolated from a piece of liana-stem—surely *B. caapi* or some kindred species of Malpighiaceæ—used in preparation of a *paricá*-snuff by Brasilian Tukano and Tarianá Indians [Biocca *et al.* 1964]. This all but substantiates at least occasional use of *ayahuasca*-stems as a snuff-ingredient.

De Budowski's group [1974] analyzed three *yopo*-snuffs of Waiká Indians from Río Mavaca in the upper Orinoco Valley. One was devoid of alkaloids, from one was isolated 2.67% bufotenine, while the other contained 1.44% 5-MeO-DMT, leading the author to suggest that the second had been prepared from seeds of *Anadenanthera*, the third from bark of *Virola* in the Myristicaceæ family (*vide* CHAPTER TWO). The Schultes-group [1977B] cited analyses of two snuff-samples, one collected in 1964 from the Tupari Indians of Brasil, the other a *yopo*-sample collected in 1966 near the Río Miriti-Paraná of Amazonian Colombia. Both contained only 0.02% DMT and no other alkaloids. Finally, we possess the sensational analysis of two 1200-year-old *cebíl* snuff-samples from complete «snuff-kits» excavated from burials in the tiny oasis of San Pedro de Atacama in the high desert of northern Chile. In both archaic snuffs it was possible to detect bufotenine, DMT and 5-MeO-DMT [Torres *et al.* 1991]!

SEEDS of var. *peregrina* thus yielded: 0.01–7.4% bufotenine [B], 0.04% 5-MeO-DMT [M], 0.16% DMT [D]; of var. *falcata*: 4.7% B, 0.01% M, 0.17% D; of var. *Cebil* (including unknown variety): 0.5–12.4% B, 0.06% M, traces D. **PODS** of var. *peregrina* gave: 0.0001% B, 0.12% M, 0.001% D; of var. *falcata*: 0.19% B, 0.006% M and 0.07% D; of var. *Cebil*: 0.05% B, 0.05% D. **LEAVES** of var. *peregrina* yielded: 0.006% each M and D; fresh material: 0.10% M and 0.01% D. **BARK** of var. *peregrina* showed: traces B, 0.025–0.39% M and 0.02% D; of var. *falcata*: 0.90% M; of var. *Cebil*: traces B and D. **ROOTS** of var. *peregrina* contained 0.68% M, traces B and D. *Piptadenia gonoacantha* contained no B, but 0.64/0.07/0.005% D in the seeds, pods and bark; 0.14/0.07% M in seeds and bark. Bufotenine thus is the major seed-alkaloid; 5-MeO-DMT is that of bark, leaves and roots, which are also psychoactive, potential snuff-sources.

Virola theiodora (SPRUCE EX BENTHAM) WARBURG [Myristicaceæ], E.W. Smith, bark-exudate of which is the principal source of various *epéna / ebene* visionary snuffs of the Waiká of Venezuela and Brasil.

CHAPTER TWO

Epéna, Hakúduf^{h}a, Yá–kee: Virola Snuffs

> The healings in which the shaman snuffs «hakúduf^{h}a» are considered to be the most powerful magic. This is a miraculous snuff-powder, used only by the shaman, prepared from the bark of a certain tree, which is crushed and allowed to boil in a vessel until the water has evaporated and has left a sediment on the bottom. [...] This «hakúduf^{h}a» has, so it would seem, an extremely stimulating effect, inasmuch as the magician then proffers song in a fierce and strident way, [while] violently thrusting the upper part of his body backwards and forwards.
>
> **Theodor Koch-Grünberg**
> *Vom Roroima zum Orinoco* [1923]

With these words the German ethnographer Theodor Koch-Grünberg made what is apparently the first report of what we now know to be a second major category of South America visionary snuffs. Studying the Río Ventuari-area of Venezuela between 1911–1913, among Yekuana (Yecuana) Indians (of Cariban idiom; who, as we have seen, are also said to be *yopo*-snuffers), he made no reference whatever to the arboreal source of the *hakúduf^{h}a*-snuff, but told us unequivocally it was prepared, not from seeds, but from the evaporated residue of boiled, crushed bark «of a certain tree», and moreover was used by the *Zauberer* or shaman for divinatory healing, to manifest «extremely stimulating» effect [Koch-Grünberg 1923]. It has been assumed, albeit not unanimously, that Koch-Grünberg's snuff was prepared from bark of a *Virola* species in the nutmeg-family or Myristicaceæ, and 16 years later, Brasilian botanist Adolpho Ducke [1938,1939], as footnote to a paper on Leguminosæ, commenting on Amazonian snuff-sources, noted: «in two localities in the upper Rio Negro, the *paricá*-powder comes from *leaves* [my emphasis] of species of *Virola* of the Myristicaceæ». Métraux [1948] added that Omaguas took *curupá* (*Anadenanthera*) snuff plus: «a decoction of the bark of the virola tree». Wurdack [1958] found no evidence «*Virola* bark-exudate was used in the Ventuari drainage», citing one Yekuana name for *ñopo*-snuff as *acujá*, strangely similar to the *ajucá* of the unrelated Pancarurú of the Rio São Francisco in Brasil, who so designate a potion of *Mimosa tenuiflora*; generically *vinho da jurema* (*vide supra et infra*). In his 1962 *communiqué* to Wassén and Holmstedt [1963], ethnographer H. Fuchs, then studying near the upper Ventuari, commented that the Makiritaré (Yekuana) made *yopo*-snuff from «ground bark of the *ai'yuku* (Piptadenia peregrina?)» [= *aiuku*; de Civrieux 1980], which in powdered

form was called *a'ku:duwha* [= *akuhua*; de Civrieux 1980], a snuff also made from *fruits* of another tree; the former «broad-leaved», the latter «small-leaved», which seems to fit *Virola* and *Anadenanthera* spp. respectively, except for the fact that the bark- and leaf-samples of snuff-material sent by Fuchs were both of an *Anadenanthera* species. Withal, to me it seems most likely, as most researchers have concluded, that Koch-Grünberg's Yekuana *hakúduf^{h}a*-snuff was derived from some species of *Virola*.

Three decades after Koch-Grünberg's pioneering report, the great Usan ethnobotanist Richard Evans Schultes shook up the tidy little world of snuff-ethnography, which had been content to attribute historical and contemporary reports of Amazonian snuffs to *Anadenanthera peregrina*, when he reported that the Puinave and Kuripako Indians prepared snuffs called *yá-kee* and *yá-to* respectively, from resinous bark-exudates of *Virola calophylla* WARBURG and *V. calophylloidea* MARKGR. [Schultes 1954]. With his customary scrupulous attention to linguistic and pharmacognostic detail and especially to the documentation of source-plants with botanical voucher-specimens, Schultes left no room for doubt that there was yet another type of Amazonian snuff, prepared from *barks*, not seeds, and barks, moreover, of classical Amazonian-rainforest trees, unlike *Anadenanthera*, which prefers far drier conditions. Schultes also attributed the use of these bark-snuffs to Kubeo (who were subsequently said to make *kúria*-snuff from bark of the *kuri-ákü*-tree [Goldman 1963]), Tukano, Barasana, Makuna and Taiwano Indians then residing in the Río Vaupés (Uaupés) of Colombia and Brasil, noting the Tukano had adopted the snuff-name *pa-ree-ká*, and suggested the Taiwano may also use *V. elongata* (BENTH.) WARB. as a snuff-source.

Schultes carefully detailed the snuff-preparation, which he said was more or less standard throughout the range in which he had documented its existence. The stripped bark was soaked in water for about half an hour, then the inner (cambial) layer was rasped-off and placed in a small quantity of water. Following periodic malaxation and squeezing, the bark-residue was strained-out and more water added to the filtrate. This was boiled and carefully inspissated, with intermittent skimming of a «sordid foam», to the consistency of syrup, which was then sun-dried. The dried crust was next ground to powder and mixed about 50:50 with ash of the bark of *Theobroma subincanum* MART., at which point it was ready to snuff. Schultes noted that the consumption of *yá-kee* was limited to shamans and that it was prepared «in small amounts and frequently», being quite perishable. Schultes' punctilious attention to important details included the requisite bioassay, which will be discussed in CHAPTER FIVE, in which insufflation of ¼ dose of *yá-kee* established «the narcotic strength of the snuff». There are only a handful of reports in the literature in which pharmacognostical details of entheogen-preparation are accompanied by voucher-

specimens and bioassays, and rarer still are those that include also chemical analysis of the plants and/or preparations. These are all *data* of crucial importance in entheobotany, and worth infinitely more than any number of reports on activities in research animals, much less in some ghoulish, vivisected slices of their brains or livers.

Four years later, Wurdack [1958] added the detail that the Baniwa (Yekuana) also made a *Virola* snuff called *nopo*, and noted, without speculating as to its source, that the Guaikas (Waikás) were «copious users of snuff, with some drug addicts [*sic*]; they will even barter their few precious machetes... when their own narcotic [*sic*] stock is exhausted». Had he perchance deigned to sample their snuff he might better have appreciated why! He did note the important detail that the Waikás insufflated *ebana* in a two-man operation, using a blowgun-like bamboo-tube packed with the powder, one blasting it into the nostrils of the other, and that Waiká-use was not limited to shamans, but included «all male Guaikas». This novel snuffing-method had already been reported by Zerries [1955,1960] who published photographs of such, noting that the Waikás call *Anadenanthera peregrina hisioma*, and that they employed two other ingredients in their snuffs, a purported Piperaceæ called *masho-hara* and the leaves of another plant named *bolek-hena*, «leaves of the death-spirit». Describing the so-called Yanonámi Waikás, Becher [1960] also mentioned as snuff-ingredient a supposititious species of Piperaceæ known as *maxarahá*. An even earlier report by Salathé [1931] attributed the blowgun-method to the Karimé, related to the Waikás, but only vaguely characterized the snuff, *kokóime*, attributed to *Banisteriopsis caapi*.

Further details on the Waiká-snuffs were soon forthcoming, in a superb review by Wassén and Holmstedt [1963], which noted there were some four types of Waiká-snuffs, all called *ebena*, of which *mishoara* «is said to give a fighting spirit» while *hisioma* «is considered to be the strongest». Citing a 1961 letter from G.J. Seitz, they stated that at least one type consisted of three ingredients: 1) the dried, roasted and pulverized bark of the *epéna-késí*-tree; 2) ashes, called *jupi-uschi*, of the outer-bark of a leguminous tree named *ama-asita*; and 3) a small herb called *maschi-hiri*, dried and pulverized. The botanical material of *epéna-késí* «most probably» represented *V. calophylla*. In three papers, Seitz [1965,1967,1969] offered excellent photographs of preparation and use of Waiká-*epéna*, the bark of which he had at first attributed to *V. calophylloidea*, and then ascribed to *V. theiodora* (SPR. EX BENTH.) WARB. (which some hold to be synonymous with *Virola elongata* [Aguirre 1971]), and identified *ama-asita*-bark, the source of the «*yupu-ushi*»-ash, as being from *Elizabetha princeps* SCHOMB. EX BENTH., Leguminosæ family. He described also preparation of *paricá*-snuff by a Tukano shaman, which had no ashes nor additives but was said to be «very strong», and remarked that the still-unidentified *mashi-hiri*-leaves had «no intoxi-

cating effect». He also made mention of two unseen ingredients to Waiká-*epénas* on the Río Maturacá: both leaves, called *poschi-have-moschi-hena* and *ai-amo-hena*. To a beautifully-illustrated monograph on South American snuffs and paraphernalia, Wassén [1965] appended a detailed catalogue of visionary snuffs from some 16 different tribal groups, about a dozen of which are most probably *Virola* preparations.

Meanwhile, Schultes and Holmstedt [1968] confirmed this Waiká-use of *Virola* snuffs, which they attributed in every case to *V. theiodora*, adding as detail that some Waiká of Río Tototobí confect *epéna sans* ashes or admixtures, and that the dried *Virola* resin was used both as visionary snuff and as dart-poison! The dart-points were simply smeared with the «slime» exuding from the exposed trunk of a *Virola* from which the bark had been stripped, then the exudate was hardened in the smoke of a fire, with 20–30 applications being made to each point, which was then set to dry in the sun. Whenever snuff-supplies were exhausted, the Waikás were seen to scrape the dried resin from the dart-points «and use the resulting powder as snuff... it has the same effect as the snuff made directly from the fresh resin» [Schultes & Holmstedt 1971]. G.T. Prance [1970] documented a similar practice among the Sanamá Waikás of Auaris in Brasil. In the Sanamá-method, the stripped bark was heated over a fire, and the exuding resin scraped onto the dart-points. Although they would «occasionally fill a small gourd with the resin» for use as snuff, «their main method of storage [of the snuff] appears to be on the arrowheads»! The source was *V. theiodora*, and the blowgun-method was used. Unlike other Waiká-groups, «no casual uses of the snuff were observed»; it was restricted to shamanic divination and funereal rites.

Schultes and Holmstedt [1968] also observed addition of *masha-hara-hanak* or *mashi-hiri* leaf-powder to powdered *Virola* resin among Waikás of the Río Tototobí, and identified the plant as *Justicia pectoralis* JACQ. var. *stenophylla* LEON. (Acanthaceæ). They were told it was added to aromatize the *Virola* snuffs, and was «not active». *Vide infra* and CHAPTER FOUR (*Justicia*) for further details on the *mashi-hiri*-snuffs.

In an interesting review of South American medicinal Myristicaceæ, Schultes and Holmstedt [1971] cited also *V. cuspidata* (BENTH.) WARB. and *V. rufula* (MART. ex DC.) WARB. as being employed to elaborate visionary snuffs. These were reported by E. Biocca [1965] to be used by the Tarianá of the Vaupés and unspecified groups on the Vaupés and Río Negro, respectively, and Schultes doubted the identification of the former, being based on a bark-sample. In the case of *V. elongata*, the Bará–Makú not only made *huyat*-snuff from its resin, but «on occasion take the resin into the mouth directly from the bark with no preparation». Although Schultes expressed doubts about this, he reported an annotation to a specimen of *V. sebifera* AUBL. from 1944 and the Río Karuaí of Venezuela: «inner bark is dried and smoked by witch-

doctors [*sic*]... it is very strong». The late T.C. Plowman collected an unidentified *Virola* whose bark was purportedly smoked with tobacco by shamans in Brasil, but chemical analysis showed this to be devoid of tryptamines [McKenna *et al.* 1984B]. One final detail in Schultes and Holmstedt's review [1971] will prove significant in my discussion of *Virola* and snuff-phytochemistry. According to Brasilian botanist E. Teixeira da Fonseca [1922], «kino» or resin of *V. bicuhyba* (SCHOTT) WARB. (which Aguirre [1971] placed in synonymy with *V. oleifera* (SCHOTT) A.C. SMITH) was said to be a «brain stimulant», while its *seed* «possesses, also, the properties of a narcotic»!

Several further studies of Waiká snuff-use appeared in the 1970s. The group of N.A. Chagnon [1970,1971], working with the Yanomamö, reported that *ebene* was a generic term for snuffs, which «may include bark, seeds, leaves, and resin from several different plants», including *Virola* trees, *yakoana* or *nyakwána*; or *hisioma*-trees, *Anadenanthera peregrina*. It was further remarked that the Yanomamö «mix several different... [snuff-] powders, irrespective of their composition, and still call the resulting mixture *ebene*». The name *ama kä asita ushi* was given for the ash of *E. princeps*, known as *ama*, and several cultivars of *henakö* or *Justicia* were collected. It was stated in no uncertain terms that these plants: «are not merely aromatic additives to *ebene* but are also used by themselves as *ebene* to produce intoxication». While noting the phenomenon of cultivation of *Anadenanthera* by the Yanomamö, it was also stated that they derived seedlings from «regions of tropical forest, where they are found in substantial feral groves», also sources of *hisioma*-seeds for trade, at odds with repeated declarations by Schultes that *Anadenanthera* is rather foreign to Amazônia. To be sure, as the word *feral* indicates, these groves likely are relict cultivars.

In another study of Yanomamö, of Río Caburiwe-teri on the Brasil–Venezuela-border, Brewer-Carias and Steyermark [1976] confirmed the solitary use of cultivated *Justicia*, *mashihiri*, as «hallucinogenic» snuffs, although generally it was used «to strengthen the more powerful [*Virola*] *épena*». Here the source was *V. elongata* (bark scrapings dried on potsherds over fire and powdered, with the addition also of ashes of *áma-ásita*, *E. princeps*). Much the same preparation of a *Virola* bark was reported by the group of Prance [1977] among the Arawakan Paumarí of the Río Purús in Brasil. To make their *kawabó*-snuff, the outer bark of *V. elongata* was scraped from a standing tree, shavings of the inner-bark collected, dried and powdered for snuff.

Several more recent reports added information to the *Virola* snuff-story. Taylor [1979] stated that Sanumá Yanoáma made a *sagona*-snuff from: «the seeds of a tree», evidently *Anadenanthera*; «the inner bark of a tree», likely *Virola*; and «the leaves of a small shrub» (*Justicia*?)—or *palalo*, *sagona sai* and *koali nagi*, respectively. In his review of *Virola* entheobotany, Schultes [1979] stated *V. peruviana* (DC.) WARB. was

«definitely employed» as a *yá-kee* snuff-source in Colombia. He later [1990] reported on a 1986 study of some Waikás of Platanal, Venezuela, where three snuffs were found. The first, *epéna*, was from *Virola* bark; the second, *yatowanaa*, from *Anadenanthera peregrina* (presumably seeds); the last, *machohara*, being from *Justicia pectoralis* var. *stenophylla*. In a study of collections from the Orinoco early in the 1950s, Boom and Moestl [1990] noted that *V. elongata* had been known as *akurjúa* in Yekuana, and «the shaman [got] drunk [*sic*] with the boiled bark of this tree». Various specific ethnomedicinal uses of *Virola* were reviewed by Plotkin and Schultes [1990] and a recent anthology contained two papers mentioning *Virola* snuffs. Hill [1992] attributed the *dzáato*-snuff of the Arawakan Wakuénai of Venezuela to the bark of *V. calophylla*, while Buchillet [1992] vaguely ascribed a *paricá*-snuff of the Tukanoan Desana either to *Anadenanthera* or *Virola*. In an earlier work on the Tukano Indians, Reichel-Dolmatoff [1971] had likewise ascribed their *vihó*-snuff to one or the other of these genera, but in posthumous works [1996A] noted it was from «bark of a forest tree (*Virola* sp.)», publishing an excellent photograph of a Bará-shaman using *vihó* [1996B]. In his review of Colombian Amazonian entheognosia [1975], he had cited *Virola* snuff-use by «many Tukano groups of the Vaupés». In his earlier review, Uscátegui [1959] attributed this Desana *paricá*-snuff to some *Virola* species. Baer [1995] had collected a snuff-powder of the Matsigenka Indians of Perú, which was said to be made of tobacco and «the crushed bark of a tree», and chemical analysis of which (*vide infra*) disclosed DMT-content, suggesting *Virola* spp. as a possible bark-source. Schultes [1988] and Schultes and Raffauf [1992] have published photographs of *Virola* trees and snuff-preparation, and Reichel-Dolmatoff [1971,1975] has documented in detail Tukanoan *vihó* snuff-related rituals and mythology. Wilbert [1996] noted that Venezuelan Warao Indians (who are not snuff-users), know stingless-bee honey (of *Trigona* spp.) from *V. surinamensis* (ROL.) WARB. to be an inebriant [*vide* Ott 1998].

EXCURSUS: «ORALLY-ACTIVE» MYRISTICACEOUS PREPARATIONS

I would like briefly to review the use of orally-ingested *Virola* resins—we've already seen that the nomadic Makú were said to ingest such resins orally, *sans* preparation. Schultes [1969] then reported that the Witoto Indians of the Río Karaparaná, had in the past ingested *processed Virola* resin, from a tree called *oo-koó-na*, probably *V. theiodora*. The inner (stripped) bark was rasped and the raspings squeezed to express the resin into a pot of water boiled five to six hours until levigated to a thick paste. This was made into coffee-bean-sized pellets called *oo-koó-he*, which were ingested as is or dissolved in water and drunk. For preservation, these were coated in a «salt»

made by evaporating the leachings of ashes from the bark of *Gustavia poeppigiana* BERG ex MART. (Brasil-nut family, Lecythidaceæ). The Muinane and Bora shared this practice, respectively calling these pellets *kutru* and *kurru*. Here, the stripped, crushed bark was boiled in water to make the syrup, and before making the *boli*, ash of fruit-husks of a wild *Theobroma* (cacao-) species was added. While likely no more than a coincidence, how bizarre it is to encounter here the word *kurru* for a snuff-related entheogen, echoing the Quechua *khuru* for *coro*-roots (*vide* CHAPTER ONE)!

In a subsequent paper, Schultes and Swain [1976] indicated that *V. theiodora* was the best source of this resin, but that another species, possibly *V. calophylla*, might also have been used by the Witoto. One year later, Schultes' group [1977A] reported that Bora Indians of the Río Yaguasyacu of Perú likewise had once made these pellets of *Virola* resin, (presumably) mainly from *V. elongata*, although *V. surinamensis* and *V. loretoensis* A.C. SMITH were indicated by residents of Brillo Nuevo also to have been so used, whereas *V. pavonis* (DC.) A.C. SMITH was moreover pointed-out as one source in Tierra Firme. More interesting was the lead from Puca Urquillo, that the myristicaceous *Iryanthera macrophylla* (BENTH.) WARB. had been a source, while in an additional paper, Schultes [1979] stated that *I. ulei* WARB. and *I. tessmannii* MARKGR. had also been named as ancestral Bora-sources of visionary pastes. In yet another paper [1986], he ascribed memory of ancestral use of *V. loretoensis* to the Witoto as well.

Finally, a recent paper cited the ancestral use of oral myristicaceous resins by the Quijos Quichua of Ecuador. Bennett and Alarcón [1994] learned that in the past the resin of *huachig caspi*, *Osteophlœum platyspermum* (DC.) WARB. was tapped from the scored trunks of the tree and cooked, «sometimes with pieces of the bark», whereupon the cooled liquid was drunk. *Angus caspi*, *Virola duckei* A.C. SMITH, had similarly been employed «hallucinogenically» and both saps were known to be mixed with *guandu* (or *huanduj*, *Brugmansia* spp.) and *tsìcta*, *Tabernæmontana sananho* RUIZ & PAVÓN such that: «a few drops placed on the noses [or rather in the nares?] of dogs... [would] make them better hunters» (*vide* CHAPTER FOUR: VETERINARY VADEMECUM).

PHYTOCHEMISTRY OF VIROLA AND KINDRED MYRISTICACEÆ

Relevant phytochemical studies on *Virola* species and their derived snuffs commenced in the mid-1960s. I shall deal with the phytochemistry of the plants first, and then proceed to the analyses of probable *Virola* snuff-powders. It was in a US-government Public Health Service Publication (No. 1645), reporting on a government-sponsored conference held in January 1967 at San Francisco, that the first salient *data* on *Virola* were published. In a chemical study which treated four *epéna*- and two *yopo*-snuffs,

Holmstedt and Lindgren [1967] analyzed a single sample of *V. calophylla* bark collected in Manaus, Brasil in 1964. They found this sample to contain three tryptamines: DMT, 5-MeO-DMT and N-MethylTryptamine [NMT; TIHKAL NO. 50], this being apparently the first report of tryptamine-alkaloids in the Myristicaceæ. No quantitative *data* were given, but the authors said that DMT was present in the «highest concentration». On the other hand, in a more complete paper two years later, the Swedish chemists, with first author Agurell [1969], citing this pioneering work, noted that 5-MeO-DMT had been «found to be the main constituent of bark from Brazil said to be derived from species of *Virola*», casting some doubt on their prior assignment of the analyzed material to *V. calophylla* (as no voucher-specimens had been cited).

Nonetheless, the 1969 paper was thoroughly documented by voucher-specimens identified by Schultes, and included *data* on two snuff-samples and five species of *Virola*, one collection of one of which had been used to prepare one of the snuffs. Most of the collections were made by Schultes during the 1967 Alpha Helix Amazon Expedition, Phase C. The barks from two collections of *V. theiodora* were found to contain 0.065% and 0.25% alkaloids; in both cases 5-MeO-DMT and DMT (95:5 and 43:52). The latter also contained 1% of the alkaloids as NMT plus 4% as 2-methyl-6-methoxy-1,2,3,4-tetrahydro-β-carboline (6-MeO-THC) which, along with its 1,2-dimethyl-derivative (6-MeO-DMTHC), both novel β-carbolines, had been reported in a separate paper the previous year [Agurell *et al.* 1968]. The leaves of both collections contained low levels of alkaloids, 0.021 and 0.044%; 98 and 99% DMT respectively. Bark from a single collection of *V. calophylla* from Manaus contained only 0.009% alkaloids, as DMT and 5-MeO-DMT (91:9), while its leaves contained much more, 0.155%, as DMT and NMT (96:4). A Manaus sample of bark of *V. rufula* showed 0.20% alkaloids, mainly 5-MeO-DMT and DMT (95:4) and in its leaves 0.098%, DMT and NMT (94:6). Two samples of *V. multinervia* DUCKE were virtually devoid of alkaloids, with only 0.001% DMT in the barks of each, and none in the leaves. Similarly, the bark of a single sample of *V. venosa* (BENTH.) WARB. contained no alkaloids, and merely a total of 0.001% DMT plus 5-MeO-DMT was found in leaves of this speecies.

Another group meanwhile studied yet another species. Corothie and Nakano [1969] isolated DMT from a Venezuelan collection of bark of *V. sebifera*. From their paper it is difficult to determine the yield, but DMT was the only alkaloidal component of a «base fraction» which constituted 0.14%, from small aliquots of which DMT was crystallized as picrate and methiodide salts. In a surprising report the following year, de Almeida Costa [1970], as an aside to an ethnographic review-paper, reported that a colleague of his, on his request, had analyzed the seeds of *V. bicuhyba*, and «the presence of bufotenine was verified». From his remarks, it is apparent that

a paper- or thin-layer chromatographic analysis was employed with authentic bufotenine as reference, but no chemical details were provided. As this is the only report of bufotenine in the genus *Virola* (although, as we shall see, it *has* been found in the related genus *Osteophlœum*), it must be treated with reserve. We do not know the details of the chromatographic assay employed, and in any given solvent-system, it would be quite possible for bufotenine to co-chromatograph with either DMT or 5-MeO-DMT. I have reviewed a report that the seeds of this species have «the properties of a narcotic» (*vide supra*), and I think it safe to assume they do contain tryptamines.

A study the following year [Cassady *et al.* 1970] found mainly NMT with «minor amounts» of DMT and 6-MeO-THC in the bark of *V. theiodora*, while its leaves and stems were devoid of tryptamines. Major alkaloid of leaves and stems of *V. cuspidata* was a new β-carboline, 6-methoxytetrahydroharman [TIHKAL NO. 44], whereas two more minor components, 6-methoxyharmalan and 6-methoxyharman were reported the following year, isolated from the same extract [Cassady *et al.* 1971]. The bark of *V. peruviana* was examined by the group of Lai [1973], and proved to contain 5-MeO-DMT, which they isolated as the major bark-tryptamine, but at low levels, less than 0.02%. «Small amounts» of DMT and 5-MeO-T were also found. The following year, visionary tryptamines were detected in bark of Brasilian *V. theiodora*, but I've only an abstract in hand which gives few specifics [Soares Maia & Rodrigues 1974]. The state of Myristicaceæ chemistry at the time, covering far more work on lignans, flavonoids and arylpropanes than on tryptamines, was summarized by Gottlieb in 1979.

But the next year saw the publication of the most complete phytochemical study of *shamanic* Myristicaceæ, again from the Schultes–Holmstedt-collaboration, this time analyzing *in situ*, fresh, documented, plants during the Alpha Helix Amazon Expedition, Phase VII (the *Alpha Helix* being an oceanographic vessel equipped with chemical laboratories) [Holmstedt *et al.* 1980]. In all, 35 collections representing 15 species of *Virola* were analyzed, along with four related species, two of which enter into the *Virola* shamanic-inebriant complex. Bark from three collections of *V. calophylla* showed low alkaloid-levels, 0.009%, typically DMT and 5-MeO-DMT (91:9), and again the leaves were much stronger, 0.115–0.155% DMT and NMT, with a 96:4 ratio reported for one strain. Bark from one collection of *V. calophylloidea* contained 0.008% tryptamines, mainly DMT and 5-MeO-DMT (50:45); whereas the leaves from two other collections of this species showed 0.001 and 0.098% alkaloids, all DMT. A single collection of *V. carinata* (SPR. ex BENTH.) WARB. was virtually devoid of alkaloids, with traces of DMT in the mixed leaves, bark and twigs, whereas two collections of *V. cuspidata* leaves were alkaloid-negative; likewise for two collections of *V. loretoensis* bark, one collection of *V. sebifera* leaves and four collections of *V. surinamensis*

(including bark-samples from each, leaves from two, and resin-paste from one). In the case of *V. divergens* DUCKE, a mixed leaf/bark-sample showed only traces of DMT.

Five collections of *V. elongata* were studied, only two of which included bark. One was devoid of alkaloids; the other had 0.003% of NMT and DMT (81:14). Two leaf-samples were alkaloid-negative, while one showed 0.019% DMT. Other alkaloids, including 5-MEO-DMT and DMT, were found in samples of phlœm and «resin» of this species. Bark from one collection of *V. melinonnii* (BEN.) SMITH had traces of DMT; leaves of another collection no alkaloids. Bark from two out of three collections of *V. multinervia* contained merely 0.001% DMT. The bark from a single collection of *V. peruviana* contained DMT and 5-MEO-DMT, but quantitation was not reported, whereas two samples of «paste» from this species contained alkaloids, up to 0.028%, virtually all 5-MEO-DMT. A single collection of *V. rufula* was high in alkaloids, 0.20% 5-MEO-DMT and DMT (95:4) in bark, with 0.098% DMT and NMT (94:6) in its leaves. Barks from two collections of *V. theiodora* contained 0.065 and 0.25% alkaloids, as 5-MEO-DMT and DMT (95:5 and 43:52); while two leaf-samples contained 0.021 and 0.044% tryptamines, virtually all DMT. Finally, barks from two samples of *V. venosa* (BENTH.) WARB. were alkaloid-negative; and leaves of one contained 0.001% DMT. It must be noted that this paper recapitulated all of the analyses reported previously [Agurell *et al.* 1969], and that there are minor errors in transcribing the *data* for one of the *V. theiodora* samples repeated here; together with minor omissions of no consequence for this discussion, in *data* reported for both *V. multinervia* and *V. venosa*.

Two species of likely importance in the «orally-ingested» myristicaceous pastes were also analyzed. Bark of *Iryanthera macrophylla* (reported as *I. ulei* in this paper, but Schultes and Raffauf [1990] later stated this was a misprint) had traces of 5-MEO-DMT. Similarly, the bark of *Osteophlœum platyspermum* (due again to a misprint, the species name was listed as *platyphyllum* in the report) contained traces of three tryptamines, DMT, 5-MEO-DMT and bufotenine. Besides the poorly-documented report of bufotenine in *V. bicuhyba*, this be a unique citation in the family Myristicaceæ.

Four years later, the group of McKenna [1984B] reported analyses of three snuff-samples and four species of *Virola*. A single sample of bark of *V. sebifera* contained 0.026% alkaloids as 5-MEO-DMT and DMT (70:30), the leaves of which contained only traces of NMT. The bark from one collection of *V. elongata* showed 0.016% NMT and DMT (62:38); whereas bark from another collection of this species contained 0.023% alkaloids, virtually all 5-MEO-DMT; while the leaves of this latter showed 0.017% DMT. Bark from one collection of *V. calophylla* contained 0.056% DMT; the seeds and fruit of another sample of this species had 0.018% DMT. Although the identification was doubted by the authors, one of four samples of presumed *V. pavonis*

(DC.) SMITH contained 0.008% DMT and NMT in leaves and twigs. The group of Kawanishi [1985] reported detection of DMT, its N-oxide, NMT and 2-methyl-1,2,3,4-tetrahydro-β-carboline in bark of Brasilian *V. sebifera*, along with N-methyl-N-formyltryptamine and N-methyl-N-acetyltryptamine. Interestingly, Jossang and colleagues [1991] isolated 5-MEO-DMT and 6-MEO-THC from leaves of a Malaysian Myristicaceæ, *Horsfieldia superba* (HOOK. F. & TH.) WARB., said to be used in ethnomedicine.

With regard to the snuffs, there are ten studies, involving a total of some 15 samples, which is a rather extensive database, as shamanic inebriants go. I have already had occasion in CHAPTER ONE to mention the report of Bernauer [1964], on isolation of 0.38% harmine and 0.08% THH from a Surára *epéna*-snuff, which probably contained *Banisteriopsis caapi* and may or may not have included *Virola*—to be sure, not one of the above-cited *Virola* alkaloids were found in this snuff. The following year, also working with a poorly-documented Waiká *epéna*-snuff from the Brasilian Orinoco, Holmstedt [1965] found the major alkaloid to be 5-MEO-DMT, along with «small amounts» of DMT and bufotenine. The snuff had been collected in 1961 by Seitz, who apparently observed its preparation, and told Holmstedt that it contained the three classic Waiká-ingredients he had documented in his papers [1965,1967,1969], and which we now know to be ground *Virola* bark, ashes of *Elizabetha princeps* and leaves of *Justicia* (leafless branches of the source-bark tree were assigned to *Virola*). Holmstedt accordingly concluded, *per* his finding of bufotenine in the snuff, «there is no reason whatsoever to believe that the seeds of... [*Anadenanthera*] *peregrina* are contained in the powder». We have seen that the Waikás will sometimes mix snuffs of distinct composition, still calling the product *epéna*, and such a possibility exists in this case—that Seitz was given a mixed *Anadenanthera*/*Virola* snuff. But we also know now that bufotenine occurs in the Myristicaceæ, at least in *Osteophlœum*, and we have a tentative report of this in *Virola*. Thus we have another piece of still more tentative evidence for bufotenine in this family, here in the *Virola* snuff-complex.

In their 1967 report which first showed tryptamines in *Virola*, Holmstedt and Lindgren also analyzed four samples of *Virola* snuffs, three obtained from Seitz. The fourth, collected by H. Becher in 1956 from the Surára and called *epéna*, evidently is the same sample analyzed by Bernauer [1964], and again harmine and THH were found, but also traces of harmaline, which is a much rarer compound in plants, further strengthening the evidence for *B. caapi* as the probable source of this powder. One of the Seitz-samples was from Waiká Indians of Río Marauiá, another from the Araraibo Indians of Río Maturacá, the third was made by a Tukano-shaman from Tapuruquara. In every case, 5-MEO-DMT was their major alkaloid, followed by DMT, with NMT being found in the Waiká-*epéna*, and 5-MEO-NMT in the Tukano-snuff.

The Agurell-group [1969] analyzed samples of *epéna-* and *nyakwána*-snuffs, of the Río Cauaburí and Tototobí, respectively. The *epéna*-sample had been thoroughly documented by Schultes and Holmstedt [1968], and consisted of *V. theiodora* bark with *E. princeps* ash and leaves of *Justicia pectoralis*. This contained 0.715% alkaloids, mainly 5-MeO-DMT and DMT (72:20), with low levels of known *Virola* β-carbolines and NMT. The *nyakwána*-snuff contained only resin of *V. theiodora*, being one of the samples of this species also analyzed in the report. In this case, an astonishing 11.0% alkaloids was found, again mainly 5-MeO-DMT and DMT (88:11), with traces of three other compounds, one a *Virola* β-carboline. The bark of the tree used to prepare this *nyakwána* had contained 0.065% alkaloids, all 5-MeO-DMT and DMT (95:5), the same profile found in the snuff. Note that these Tototobí shaman-pharmacognosists had thus achieved a 170-fold enrichment in their dried exudate! As a natural-products chemist—and sometime basement-shaman—I admiringly doff my *gorro* to them!

The group of Chagnon [1971] analyzed various samples of Yanomamö *yakoana*-snuffs, presumably confected of the *Virola* and *Justicia* species mentioned in their report. They noted their alkaloidal content varied from 0.15–2.0%, being roughly equal amounts of 5-MeO-DMT and its N-oxide, with traces of simple tryptamine. De Budowski's group [1974] then analyzed three *yopo*-snuffs from the Pixaasi-teri Indians of the Río Mavaca in the upper Orinoco, one of which was devoid of alkaloids. One had apparently been made from *Anadenanthera*, as it contained 2.7% bufotenine (*vide* CHAPTER ONE). The third was more likely made from *Virola*, as it yielded 1.44% 5-MeO-DMT by isolation. Grossa and colleagues [1975] then reported their analysis of an *epéna*-snuff, collected also from the Pixaasi-teri (here called Bisashi-teri), of the Río Ocamo and made «probably» of bark-scratchings of *V. calophylla*. This group isolated 1.17% 5-MeO-DMT from this *epéna*-snuff; no other alkaloids reported.

There was apparently a mistake in reporting of results in the paper by Schultes and colleagues in 1977 [B], which involved *Anadenanthera* species. The former of the two snuff-samples reported at the end of their tabular results evidently was misidentified. According to Baer [1995], this is material he collected and should be identified as a Matsigenka-snuff from eastern Perú, 1969. In this paper on Matsigenka tobacco-shamanism, to which we shall return, he noted that this snuff was made of «tobacco and the crushed bark of a tree»—which nobody was able to name. Inasmuch as the Schultes-group found low levels of DMT in the snuff, 0.016%, Baer speculated in his paper that *A. peregrina* was a probable source of the bark. As we have seen, the bark of its var. *peregrina* indeed contains DMT, but no more than 0.02% has been found, 5-MeO-DMT predominating (up to 0.39%). On the other hand, we have seen DMT is the sole or major alkaloid in the barks of numerous species of *Virola*, in far higher

amounts in some species, up to 0.13%, and so is also a possible source of the crushed bark in this snuff, although the Piro, culturally related to the Arawakan Matsigenka, are known to snuff and eat *A. peregrina* seeds, and to my knowledge *Virola* snuffing has not been reported among these peoples. Clearly, more research is wanted here.

Studying dart-poisons, the group of Galeffi [1983] found 8%, or roughly 12 mg of 5-MeO-DMT each, in the dart-poison scraped from darts of the Brasilian Yanoáma (Waikás). We have seen that Schultes and Holmstedt [1968,1971] and Prance [1970] reported the practice of coating dart-points with resin of *V. theiodora* by Waikás in this area of Brasil (Roraima), and that the dart-points were scraped to get visionary snuff, this being the principal snuff-storage method of one tribe. Indeed, the bark-sample of *V. theiodora* which had been used in preparing the *nyakwána*-snuff reported by the group of Agurell [1969] to contain 11.0% 5-MeO-DMT and DMT (88:11), was from the very tree the Waikás used to paint the dart-tips. Since Schultes tells us that the snuff was being made while the darts were being loaded, presumably the *nyakwána* analyzed had not been scraped from dart-points, but here we see 8% 5-MeO-DMT on dart-point «snuff», which compares favorably with the 9.7% found in the *nyakwána*-snuff. We'll see in CHAPTER FIVE that 12 mg *per* dart represents an active, human intranasal dose—imagine what it might do injected into a small monkey!

The following year, McKenna and his colleagues [1984B] studied three snuffs obtained from Venezuelan Yanomamö Indians roughly a decade earlier and labeled *buhenak+mashahara*, *mashahari* and *yakuana-sagona*. The first two were «aromatic powdered leaves… almost certainly *Justicia pectoralis* var. *stenophylla*», as the names suggest (*vide supra* and CHAPTER FOUR: *Justicia*). The former was devoid of alkaloids, while the latter contained 0.061% 5-MeO-DMT and DMT (85:15). The *yakuana-sagona* was «dark reddish powdered bark material» which the authors deemed to be «powdered, concentrated *Virola* resin or… snuff containing *Virola* resin plus other admixtures». This contained 1.97% of 5-MeO-DMT, supporting this identification. Regarding *J. pectoralis*, in CHAPTER FOUR I review contradictory chemical evidence on tryptamine-content, but I think it now safe to assume from this analysis and the reports that it be used alone as *epéna*-snuff (*vide supra*), that at least some strains contain low levels of 5-MeO-DMT and/or DMT. Here a sample of *caraknak*, apparently a carbonized *Virola* resin, likewise contained 0.038% 5-MeO-DMT and DMT (83:17).

Accordingly, we have seen that 14 species of *Virola* contain psychoptic tryptamines, 12 in the barks and 8 in leaves. As they are not likely germane to the subject of *Virola* snuffs, I have purposely overlooked analyses of other plant-parts. Seeds, of course, would be salient, but we have very little evidence on this point, other than the anomalous report, which requires confirmation, of bufotenine in seeds of *V. bicuhyba*,

(never reported as a snuff-plant), and the finding of 0.018% DMT in «seeds and fruit» of *V. calophylla*. As for leaves of these *Virola* species, DMT is clearly the most important alkaloid, found in concentrations as high as 0.149% in *V. calophylla*. Some leaf-samples contained minor amounts of NMT, and only traces of 5-MEO-DMT have been found. Up to 0.25% tryptamines have been found in shamanic *Virola* barks, and 5-MEO-DMT is decidedly their most important alkaloid, although common secondary alkaloid DMT seems to predominate in species containing very low alkaloid-levels, the exception being that strain of *V. theiodora* with the highest bark alkaloid-levels reported, which showed slightly more DMT than 5-MEO-DMT (52:43). Also commonly found in barks is NMT, being even the major alkaloid in some strains of *V. elongata*.

Turning to the snuffs, we have qualitative *data* on 11 samples which we can confidently ascribe to *Virola* source-trees (setting aside the twice-analyzed *epéna*-sample which contained only *Banisteriopsis* alkaloids, and a Matsigenka tobacco-snuff with «crushed bark» of unknown provenience). In every case, 5-MEO-DMT was the major snuff-alkaloid, while DMT was found as a secondary tryptamine in six samples, and bufotenine in one. We possess quantitative *data* on seven of these snuffs, which contained from 0.15–11.0% alkaloids (average: 3.63%), exclusively as 5-MEO-DMT in five cases, and two contained DMT, 11:88 and 20:72 in relation to the major compound, 5-MEO-DMT. All snuffs were apparently made from *Virola* bark or extract/exudate, and their alkaloid-profiles match those of the barks. Only two snuffs were reliably documented as to source—*V. theiodora* in both cases. Seven of the 14 *Virola* species with psychoptic tryptamines had extremely low levels, probably insignificant pharmacologically. Those containing more significant amounts of visionary tryptamines are: *V. calophylla*, *V. calophylloidea*, *V. elongata*, *V. peruviana*, *V. rufula*, *V. sebifera* and *V. theiodora*. Intriguingly, each of these species has been reported to be employed in shamanic snuffs (in the case of *V. sebifera*, the bark was said rather to be smoked by shamans); and the only reported snuff-species which has not yet been shown to produce visionary tryptamines is *V. cuspidata*, bark of which has yet to be studied. Eight samples of «oral» pastes from three species contained 5-MEO-DMT: *V. elongata* (up to 1.57%); *V. peruviana* (0.017–0.028%) and *V. sebifera* (1.88% 5-MEO-DMT and DMT, 70:20), but psychonautic *data* questioned a pharmacological importance for tryptamines [Holmstedt *et al.* 1980; McKenna *et al.* 1984B; MacRae & Towers 1984A].

VIROLA AND ANADENANTHERA LEAVES AS POTENTIAL SNUFF-SOURCES

As we saw at the outset of this chapter, the first to identify the genus *Virola* as source of shamanic snuffs was Ducke, some 60 years ago, and this reliable source of botanical information stated unequivocally that Río Negro *paricá*-snuff was made from *Virola* LEAVES. In CHAPTER ONE I reviewed some of the citations to Amazonian leaf-snuffs, such as the Omagua *curupá*-snuff, made from the tree of that name, the seeds of which yielded *paricá*-snuff; the Cocama-*curupá*, Ipurina-*paricá* and the Chibcha-*yopa*—all alike snuffs made from LEAVES. I think it is just to conclude that leaves both of *Anadenanthera* and *Virola* species have been used in elaborating shamanic snuffs. As for *Anadenanthera*, la Condamine's 1749 report that the *curupá*-tree yielded two Omagua-snuffs—one from leaves and one from seeds—points unequivocally to that genus, and there is no question a shamanic leaf-snuff was once derived from it, along with more common seed-snuffs *cohoba/ñopo/yopo*. The phytochemical evidence already reviewed demonstrates beyond doubt the visionary potential of *Anadenanthera* leaves—Schultes-group's [1977B] analysis of fresh leaves of var. *peregrina* disclosed 0.11% tryptamines, 5-MEO-DMT and DMT (88:12), which is almost half the highest tryptamine-concentration ever found in any *Virola* bark (0.25%).

By the same token, we can scarcely dismiss as erroneous Ducke's report that *Virola* leaves were the source of *paricá*-snuffs in two discrete areas of the Río Negro, inasmuch as he was an experienced Brasilian field-botanist, well familiar, not only with *Anadenanthera* and *Virola*, but with Amazonian shamanic inebriants, on which he published some key papers. This was the first time *any* myristicaceous genus had been associated with PSYCHOPTICA, and his report referred to the area we now know to be the center of a large complex of snuffs and other shamanic inebriants involving at least nine *Virola* species. We also know that leaves of some eight *Virola* species do contain visionary tryptamines, up to 0.149% 5-MEO-DMT (⅔ the highest level found in any *Virola* bark). Indeed, in that particular strain of *V. calophylla*, the leaves had *more than 17-fold the tryptamine-level of the bark*, whereas analysis of two distinct strains of *V. calophylloidea* found leaves of one to contain *more than 12-fold the tryptamine content of the bark of the other*, and analysis of 12 samples from 4 collections of *V. elongata* found the highest alkaloid-levels to be *in leaves* [Holmstedt *et al.* 1980]. This being the case, it would be rather surprising were *Virola* leaves *not* exploited in entheogen-manufacture, and would be rash and unwarranted to eliminate either *Virola* or *Anadenanthera* from consideration as possible sources of leaf-based snuffs.

Nor can we assume presence of bufotenine in a snuff automatically points to *Anadenanthera* as source. Bufotenine was reported in *Osteophlœum*, in *Virola bicuhyba* fruits, in a Waiká *epéna*-snuff ostensibly based on *Virola* and devoid of *Anadenanthera* (to be sure, since the Waikás make snuffs from both trees, cross-contamination from a vessel, mortar or container previously used with *Anadenanthera* might well have occurred) and twice in *Diplopterys cabrerana*, conceivably used in shamanic snuffs.

Nicotiana tabacum L. [Solanaceæ], M. Blos,
petún or *tabaco*, source of most traditional tobacco-snuffing
and -smoking preparations, as well as our modern cigars and cigarettes.

CHAPTER THREE

Nicotiana or Tobacco-Based Snuffs

> The smoking-tube seller... a maker of *acaiietl*, [reed smoking-canes]... filled with tobacco... with entheogens, with *vei nacazio*... with *oâcalsuchio*, with *tlilsuchio*, with *mecasuchio*, with *nanacaio* [or mushrooms], with *poiomaio*, with obsidian tobacco... It inebriates, makes one dizzy, it possesses one... It is pounded on a stone, it is placed inside a tobacco-tube... It is smoked.
>
> **Bernardino de Sahagún**
> *Florentine Codex* [*ca.* 1570]

The world's second anthropologist, Franciscan friar Bernardino de Sahagún, who bequeathed to us—in the Náhuatl words of elderly *sabios*—by far the most comprehensive and detailed study of any precontact American culture, here described the Mexica- (Aztec-) practice of smoking tobacco in reed-tubes, called *acáyetl* or «tobacco-reeds», mixed with all manner of entheogens, including mushrooms, probably *tzontecomananácatl*, *Amanita muscaria* (L. ex FR.) PERS. ex GR. [*vide* Ott 1996 for details]. This smoking of tobacco as *acáyetl* or *pocúyetl* (cigars) apparently was reserved especially for festive and ceremonial occasions, whereas by far the most common tobacco-use in Mesoamerica at the time of contact was as *tenéxyetl*, «limed tobacco», which was sucked like a *coca*-quid, being one part lime to ten of tobacco, also having an important ritual role. But the Nahuas snuffed tobacco as well, at least as a headache-remedy, and I suggest that the Náhuatl name for tobacco as a snuff was *yecoxo*, hitherto recondite (from *yetl*, «tobacco», and *coxonqui*, «dried and ground»: Sahagún recorded headache-curing by «inhaling *yecoxo*, by inhaling tobacco»; and in his Castillian rendering said: «*[y]ecuxo*, or the green *piciétl* [= *Nicotiana rustica* L.] herb»). They drank tobacco-potions also, surely the *itzpactli* or «obsidian-medicine» of Sahagún—which may also have been known as *tlapacóyetl*, «washed tobacco»—and used small tobacco-pellets designated *yiaqualli* [de la Garza 1990; Hernández 1942; Reko 1919; Sahagún 1950-69; Siméon 1997; Sullivan *et al.* 1997; Vetancurt 1982]. Furst [1974,1996] summarized abundant archæological evidence for the antiquity and broad distribution of Mesoamerican liquid-snuffing, dating back to 1500 B.C. and extending from Colima and Nayarit, in the north, to the Olmecan area in the southeast: he proposed that many Olmecan jade «spoons»—some graced by avian and feline motifs—were in reality snuff-tablets (*vide* CHAPTER ONE). I think it more likely they were snuff-*mortars*, as well as snuffing tablets, and Olmecan «shamans' bundles» have yielded exquisite jade-pestles carved as immature *A. muscaria* mush-

rooms, being smoked with tobacco by Mayan shamans to this day [Rätsch 1998a].

Smoking tobacco in reed-tubes was common, as far north as the contemporary SW United States, where numerous archaic «reedgrass cigarettes» are known—tubes of *Phragmites australis* (CAV.) TRIN. ex STEUD. containing *Nicotiana attenuata* (TORR.) WATS. plus other plants [Adams 1990]. This reed, *ácatl* in Náhuatl, was used by the Aztecs to make ornate *acáyetl* tobacco-tubes, smoking of which extended at least to the Caribbean-basin [Wilbert 1987]. A famous Mayan relief-carving from Palenque shows the jaguar-skinned GOD L smoking a *chamál* (or *acáyetl*) on 20 January 690 (perhaps containing tobacco and *kakuljá*, *Amanita muscaria*), while an incised fragment of conch-shell depicts a noble smoking a slender cigar [Schele & Miller 1986]; and tobacco-snuff was known in the Maya-area, for a 1704 Kakchiquél-lexicon gives us *may*: «nose-tobacco». I doubt that it be merely fortuitous that *P. australis*, at least in its rhizomes, happens to contain DMT, bufotenine and 5-MEO-DMT [Wassel *et al.* 1985]. I might add that 20TH-century southwestern Tewa Indians were observed to snuff *Nicotiana attenuata* [Robbins *et al.* 1916], Apache Indians still smoked *acáyetl* [Reagan 1929], and the far-distant Mikasuki Seminoles of la Florida used *Phragmites australis* stems as «medicine tubes» or «medicine blowing tubes» [Sturtevant 1955].

At the outset I noted that the word *tobacco* apparently derives, not from any fumatory or snuff-plant, but rather from the tube used to ingest these, either by insufflation, or by buccal or rhinal *inhalation*. Oviedo y Valdés [1944] was the first to use *tabaco* in print, and he stated clearly it was a «snuff-tube» used for rhinal inhalation of *smoke* from leaves—of the plant we now call *tobacco*—laid in bundles on a fire inside a hut, adding that paupers unable to afford elaborate, Y-shaped *tabacos* used a cane of *Phragmites*. The Mura Indians were subsequently said to call their bone snuff-tubes *tabocas* [von Reis Altschul 1972], whereas von Spix and Martius [1831]—referring to Mura *Anadenanthera* snuff—stated the Indians: «fill the paricá [snuff] from large bamboo pipes (*tabocas*)». Although Torres [1996b] rejected snuff-tube rhinal smoke-inhalation as being uncorroborated, both von Reis Altschul [1972] and Wilbert [1987] accepted it, and I'm inclined to agree with them. André Thevet [1558] and Juan de Cárdenas [1988] both animadverted to Indians absorbing «fœtid smoke… by mouth and *nostrils*», Hernández [1942] explicitly described inhalation of *acáyetl* by «the mouth or the nose» and burning psychoactive plants on open fires is well known, both in Africa and South America. Panamanian Cuna imbibe blown tobacco-smoke within a special house, while *cacao*-beans (*Theobroma cacao* L.) and *chile* (*Capsicum* spp.) are burned on open fires, «snuffing it up greedily», their hands cupped «round their mouths and noses» [Wilbert 1987]. Furthermore, we have seen such documented for snuff-plants: I commented in CHAPTER ONE that Abipón In-

dians of the Chaco were reported early in the 19TH century to burn *cebíl*-seeds and pods within closed huts; again, reference was made specifically to inhaling of smoke with their *noses*; although only Oviedo y Valdés mentioned such use of snuff-tubes.

Tobacco-snuffing seems to have been uncommon in precontact North America, where the ritual pipe or *calumet* reigned supreme. The Tewa-Indian snuffing of *N. attenuata* was described as medicinally specific, as in the *yecoxo* of the Aztecs, in this case to treat nasal discharge and in ethnogynecology, evidently as ecbolic. Hartwich [1911] reported that the Northwest Coast Nootka Indians took tobacco-snuff, which was later documented by Harrington [1932] among the northern California Karok. In southern California, seemingly a center of radiation for the genus *Nicotiana*, no fewer than four wild tobaccos were smoked by native peoples, the above-mentioned *N. attenuata* as well as *N. bigelovii* (TORR.) WATS., *N. clevelandii* GRAY and *N. trigonophylla* DUNAL—while *N. glauca* GRAHAM or «tree-tobacco», and the «white man's tobacco» [*sic*], *N. tabacum* L. (both introduced postcontact), were eagerly adopted. The southern California Cahuilla were said to chew, smoke and drink—but not to snuff—their tobacco [Bean & Saubel 1972], although the Kawaiisu treated headache by snuffing *N. quadrivalvis* PURSH. [Moerman 1998], which was cultivated all along the Missouri River; and the Crows recognized, and may have cultivated, two species [Lowie 1919]. East of the Mississippi, however, *Nicotiana rustica* was predominant [Gilmore 1919]. Tobacco-growing clearly constituted the first stirrings of incipient agriculture among many hunting-gathering peoples [Bean & Saubel 1972; Van Allen Murphy 1990]. Since snuffing of other plants—many of which were common admixtures to smoking-tobaccos (*vide* CHAPTER FOUR: *Acorus*, *Arctostaphylos*, *Artemisia*, *Fomes*, *Magnolia*, *Veratrum*) [Turner *et al.* 1990]—was rather general and diffuse, it seems probable that *kinnikinnick*-snuffs with tobaccos were also very broadly used.

As we shall see in CHAPTER FOUR, medicinal and shamanic snuffing of an extensive pharmacopœia of ethnomedicines is widespread in Africa. Even 'though there is a native African species, *N. africana* MERX. & BUTT. [Goodspeed 1954], this was not exploited, and tobacco was introduced to Africa in postcontact times. Nevertheless, tobacco-snuffing rapidly diffused all over the continent, from Morocco to Madagascar [Hambly 1930; Linton 1930]. Although it has been stated that snuffing *per se* was a postcontact introduction to Palæogæa, this is decidedly not the case. Not only were «sneeze-powders» an integral part of the classical Egyptian, Greek and Roman pharmacopœias [Rätsch 1995], but we find in Africa such elaborate, highly-developed snuff-related paraphernalia—containers, spoons, mortars and that uniquely African innovation, the «nose-clip», to retain liquids or powders once insufflated—not to overlook the diffuse and eclectic *ceremonial* use of shamanic snuffs based on clearly

indigenous plants, as to make it all but certain that African snuffing is precontact and independent of its South American development. Neither is it true, as has been said, that smoking was unknown in Palæogæa prior to contact with the Americas. Precolumbian 14TH-century pipes have been excavated in Ethiopia, and these were shown to contain residues of *Cannabis* compounds [de Smet 1998; Van der Merwe 1975]. We have Herodotus' report of the Scythians «smoking» *Cannabis* as the Abipón had *cebíl*—on open fires, here within a type of *sauna*—and the ritual smoking of *Cannabis* is likewise clearly archaic in the Himalayan area [Rätsch 1996B,1998B].

Several species of *Nicotiana* are native to Australia, and were exploited by the Aborigines as inebriants and hunting poisons [Ott 1996], but these were taken as masticatories with ash-admixtures, not as snuffs. Perhaps of greater importance to Aboriginal cultures was their masticatory *pituri*, prepared from leaves of *Duboisia hopwoodii* V. MUEL. (Solanaceæ) which are even richer in nicotine than most tobaccos. Again, ashes were added to *pituri*, the most common source being *wirra*, *Acacia aneura* V. MUEL. (Leguminosæ), and characteristic of *pituri*-chewing was passing the quid from mouth to mouth and the «storage» of a chewed quid behind the ear [Watson 1983A,1983B]. Similar «storage» has been documented with chewed tobaccos in Africa and South America [Linton 1930; Wilbert 1987], and it's been suggested the delicate skin behind the ear may perchance be as good a site for nicotine-absorption as the buccal cavity. Powders may be puffed into the mouth for traditional Chinese therapy [Saint Laurent 1999], *Cannabis* leaves snuffed in Indian Ayurvedic medicine [Nadkarni 1976]; and identification of *thapana*, a Nepali Kirati shamanic snuff containing *Cannabis*, points to the possibility of an archaic Asian shamanic snuff-complex [Müller-Ebeling *et al.* 2000]. Wassén [1995] has remarked U-shaped «blast pipe» snuff-tubes from Thailand, but these are metallic and used to snuff non-traditional tobacco-mixtures. Tobacco-snuffing enjoyed a brief *vogue* in China in the seventeenth century—the practice was introduced by the Jesuits, so closely associated with this habit that their converts came to be known as «snuff-takers». I have mentioned that snuffing as a means to pleasure or to inebriation had been unknown in precontact Europe, and its introduction during the sixteenth century was a sideline of Catholic clergymen, wont to sneak «discrete pinches» from the altar during Mass—first in Spain, then Portugal and later Italy. There were some Papal Bulls against this indulgence, but with the canonization of St. Joseph in the mid-18TH century (his «devil's advocate» had argued that he had been a snuff-taker), and the ascension of the snuff-taking Pope Urban VII, the die was cast, and in 1779 the Vatican began trafficking, by opening its own tobacco-factory [Alcántara 1987; Brooks 1953; Goodman 1993]!

Ritual and ludible taking of tobacco-snuffs—both dry and liquid—is extensively

documented in South America. In his excellent and comprehensive survey of shamanic tobacco-use on that continent, Wilbert [1987] has enumerated 53 tribes known to snuff tobacco, a list extensible to 59 pursuant to subsequent research, making this the third most common route of tobacco-ingestion, after smoking (233 tribes) and drinking (64); followed by chewing (56), tobacco-paste «licking» (16) and enemas (2). Moreover, since Wilbert had included under the rubric of «drinking», several instances of the insufflation of tobacco-liquids—that I classify as snuffs—snuffing is therefore second only to smoking in South American tobacco-ingestion. Wilbert has delineated five *foci* of tobacco-snuff use which, not surprisingly, are congruent with those major strongholds of *Anadenanthera* and *Virola* snuffing: the Orinoco, northwest Amazônia, the Peruvian *montaña*, the Río Guaporé and the Andes. I refer the reader to his book for specific details of its compass. Schultes and Raffauf [1990] noted that in northwestern Amazônia, tobacco was usually taken as snuff for ludible purposes, whereas smoking was frequently reserved for shamanic use, adding that almost all of the Colombian tribes enjoy tobacco-snuffs. In some cases, *viz.* the Matses of Perú, tobacco-snuff (in this case, *nu-nu*) is by far the most important shamanic inebriant, besides being the only visionary snuff employed [Gorman 1990,1993].

Preparation of tobacco-snuffs is relatively simple: either the fresh or dried leaves are infused in water for liquid snuffs, or the dried leaves are pulverized then sometimes sifted. Many groups contriturate ashes in snuffs, most commonly of barks or fruit-husks of Sterculiaceæ, or the cacao-family. The Brasilian Dení, Jarawara and Jamamadí employ bark-ashes of *Theobroma subincanum* [Prance 1972,1978], likewise utilized by the Tukuna, while the Ipurina were said to use ashes from cacao-fruit husks [Wilbert 1987]. The Peruvian Matses make *nu-nu* tobacco-snuff with bark-ash of *mocambo*, a *Theobroma*, probably *T. bicolor* HUMB. & BONPL. [Gorman 1990], while in Surinam and French Guyana, African-American *mestizos* are given to a liquid tobacco-snuff, made by moistening tobacco-leaves dusted with ash from burning the trunks of *Sterculia* species—the leaves are then squeezed, the expressed fluid snuffed out of the palm [Plotkin *et al.* 1980]. The Brasil-nut family, Lecythidaceæ, is an important ash-source in tobacco-preparations; that holds for the *Virola* bark-pastes reviewed in CHAPTER TWO, employing cacao-ashes, too. The Tukuna add ash of *Eschweilera coriacea* (DC.) MART. EX BERG. fruit-rinds to tobacco-snuffs, while the Yabutí add pulverized Brasil-nut shells (*Bertholletia excelsa* HUMB. & BONPL.), there being reports that shells of these nuts serve as handy snuff-mortars. The Tukuna are known also to add bark-ashes from a *Capirona* species (Rubiaceæ) to tobacco-snuffs [Wilbert 1987]; and the Barasana, *Cecropia* leaf-ashes (Moraceæ) [Schultes 1985B].

Plants added to tobacco run the gamut of South American shamanic inebriants.

Commencing with other snuff-plants, there is abundant evidence for the addition of *Anadenanthera* seed-powder to tobacco-snuffs. We saw in CHAPTER ONE that tobacco for snuff was combined with *cebíl*-seeds by Indians of the Chaco, and the two entheogens are still smoked together by the Wichi. In the Río Guaporé-area on the border between Bolivia and Brasil, for many tribes, such as the Tupari and Yabutí, shamanic snuffs are: «usually a blend of tobacco, parica, and other materials» [Wilbert 1987]. Wilbert also noted the admixture of *Virola* barks into tobacco-snuffs. While there are some reports of blending «tree-barks» with tobacco-snuffs, these are not supported by botanical vouchers. In CHAPTER TWO I reviewed evidence that a «crushed bark» added to a Peruvian Matsigenka tobacco-snuff were likely *Virola*—it is well known that simple crushed barks of *Virola* are employed in snuffs, and this snuff contained DMT. Reichel-Dolmatoff [1975] specifically described the blending of a tobacco-snuff with *vihó* or *Virola* bark-snuff by Colombian Tukanoan Indians.

Reichel-Dolmatoff [1996A] later noted Colombian Tukano Indians snuffed tobacco combined with pulverized bark of *Banisteriopsis* (Malpighiaceæ) or powdered *coca*-leaves (*Erythroxylum coca* LAM. var. *ipadu* PLOWMAN), and in CHAPTER FOUR I review additional evidence for a use both of *ayahuasca*-stems and *ipadú coca*-leaves in shamanic snuffs, as well as a similar use of *Piper* and *Capsicum* species (Piperaceæ and Solanaceæ) in snuffs, both of which may sometimes be added to tobacco-snuffs. Infusions of the famous Andean *San Pedro*-cactus, *Trichocereus pachanoi*, plus «wild black tobacco juice» [Sharon 1979], may be snuffed intranasally by *mestizo* Peruvian *curanderos* as an adjunct to well-documented shamanic *mesas* or healing ceremonies [Calderón *et al.* 1982; Glass-Coffin 1998; Joralemon & Sharon 1993; Polia Meconi 1996; Sharon 1978]. Finally, in CHAPTER FOUR may be found further details on the Paumarí shamanic snuff called *koribó-nafuni*, compounded of powdered and sifted tobacco with similarly-prepared leaves of a bignoniaceous liana, *Tanæcium nocturnum* (BARB.-RODR.) BURM. & SCHUM. [Prance 1978; Prance *et al.* 1977]. Yet another recondite shamanic snuff—of the Colombian Makuna and Barasana Indians—consists of the powdered leaves of *Pagamea macrophylla* SPR. ex BENTH. (Rubiaceæ) [Schultes 1980B]—this is undoubtedly combined sometimes with tobacco-snuffs. I would be remiss should I fail to mention in this context the mysterious *takini*-entheogen of Arawakan Kariñas from the Guyanas, the red latex of *Helicostylis tomentosa* (POEPP. & ENDL.) MACBR. and *H. pedunculata* BEN., from the family Moraceæ. In conjunction with oral ingestion of prodigious doses of tobacco-infusions and tobacco-pellets, shamanic initiates *inhale the fumes* of *takini*-latex, a sort of ethereal errhine [von Reis Altschul & Lipp 1982; Wilbert 1987]. There is an equally abstruse moraceous shamanic snuff, the *rapé dos índios* from fruits of *Maquira sclerophylla*, formerly used in the

upper Rio Xingú of Brasil, presumably by the Mundurucú (*vide* CHAPTER FOUR). It'll be instructive to examine plant- and ash-admixtures to non-snuff tobacco-preparations, as well as to *Anadenanthera* and *Virola* snuffs, *ipadú coca* and *ayahuasca*.

PARENTHESIS: PLANT/ASH-ADDITIVES TO OTHER SHAMANIC INEBRIANTS

Sticking for the nonce to tobacco, we find in northwest Amazônia, nearby Andean regions and the Peruvian/Ecuadorian *montaña*, use of buccal tobacco «pastes» analogous to resins of *Virola* barks. The Witoto and Bora of the *montaña* call these *ambíl* or *yera* [Candre 1996; Schultes 1945]; prepared by lengthy boiling and concentration to a syrupy consistency of fresh, green leaves of cultivated tobacco, *Nicotiana tabacum*, to which are added at the end the same «salts» derived from evaporating water leached through bark-ashes, as are employed by them also as coatings for their «pellets» of *Virola* bark-pastes—particularly from lecythidaceous trees of the genera *Gustavia* and *Eschweilera*, but including also the wild cacao *Theobroma subincanum* (Sterculiaceæ). Sionas—the only Tukanoan tribes to prepare *ambíl*—use the ashes of *cacao colorado del monte*, «wild red cacao» husks, either *T. subincanum* (added by Tukanoans to *Virola* bark *yá-kee*-snuffs) or *Herrania breviligulata* SCHULT., but also add ashes from the *pods* of *yoco*, *Paullinia yoco* SCHULT. & KILL., (Sapindaceæ; *bark*-infusions of which are esteemed caffeine-rich Amazonian stimulants) [Calella 1945; Wilbert 1987], while Witoto Indians use gourds of large fruits of *Theobroma bicolor* as *ambíl*-containers, which are reputed to aromatize their tobacco-pastes [Schultes & Raffauf 1990]. Witotos add *marákio*, a malpighiaceous vine, to *yera*/*ambíl*; probably *Banisteriopsis caapi* or a related *yajélayahuasca* source-plant, and their name for *Virola*, *oo-koó-na* (or *úkuna*), means «jungle-tobacco» [Candre 1996; Urbina 1992]. Witotos also *smoke* «crushed leaves and young bark» of *Banisteriopsis caapi*, at times evidently mixed with tobacco, inasmuch as they told Schultes [1985C]: «the intoxication produced would be extremely strong and long-lasting». Arawakan Matsigenka prepare *opatsa seri* tobacco-paste with powdered *Banisteriopsis* liana [Shepard 1998].

The Amazonian custom of confecting tobacco-linctuses or lambitive tobacco-pastes for buccal absorption is found in the northern Andes, among the Kogi and other tribes of the Sierra Nevada de Santa Marta, Colombia, who use tobacco traditionally in no other way. These Arawakan tribes apparently do not add ashes to their *ambirá* tobacco-concentrate, generally taken with *hayo* or *coca*, a habit also characteristic of the Witoto, with whom the Kogi share other cultural traits [Uscátegui 1959]. Delightfully, the Amazonian ambrosia *ambíl*, which embraced the Andes of northern Colombia, has seduced the urbane *mestizo* cultures of Venezuela—where

tobacco-syrup is known as *chimó*—and of adjoining northeastern Colombia, where it is called *chimú* [Kamen-Kaye 1971,1975]. Details of the preparation are remarkably similar to those reported from Amazônia, even the use of an ash-leachate—*cernada* or «strained» in Venezuela—as an alkaline additive, although for the levigation of *chimó*, the ash-imbued water is not evaporated to a solid «salt», but filtered and added to the tobacco-extract prior to its final concentration. In this case, the preferred ashes are from woods of *bucare*, *Erythrina* trees (Leguminosæ) used to shade coffee-plantations, but as among the Siona, the ashes from banana-skins may also be used.

More intriguing still are the various flavorings and other additives to *chimó*, the most important being *curía-* or *caría*-leaves, *Justicia caracasana* and *J. pectoralis*, the Waiká *masha-hiri* snuff-plant. *Sarrapia* or tonka bean, *Dipterxy odorata* WILLD. (Leguminosæ), and nutmeg, *Myristica fragrans* HOUTT., also flavor *chimó*, and both are, like *J. pectoralis*, reputed to be psychoactive [Rätsch 1998A; Uphof 1968; Van Gils & Cox 1994; Weil 1967]. Nutmeg, of course, is in the same Myristicaceæ family of *Virola*, albeit of postcontact introduction to South America. Moreover, leaves from five different species of Rubiaceæ are added to *chimó*: *Cephælis tinctoria*, *Guettarda sabiceoides*, *Palicourea chimó*, *Psychotria amita* and *P. aubletiana* [Kamen-Kaye 1975; von Reis Altschul 1973; von Reis Altschul & Lipp 1982]. Dried leaves of *Cephaælis williamsii* STANDL. are likewise added to smoking-tobacco in the Colombian Putumayo [Schultes & Raffauf 1990]; leaves of rubiaceous *Hamelia nodosa* serve as a smoking-tobacco *substitute* in Honduras, while South African Bushmen smoke leaves of rubiaceous *Heinsia benguelensis* [von Reis Altschul 1973; von Reis Altschul & Lipp 1982].

The Lecythidaceæ again loom large in the case of adjuncts to smoking-tobaccos. In this case bark or bark-paper, known as *ta[h]uari* or *tabari*, of species of *Allantoma*, *Couratari*a, *Lecythis* and *Eschweilera*, are widely used as cigar-wrappers. Curiously, a number of species of *Eschweilera* have «*cacao*» in their common-names. A similar bark cigar-wrap is derived from species of *Arrabidæa* and *Tabebuia* of the family Bignoniaceæ, which includes also *Tanæcium nocturnum*, leaves of which are combined with tobacco in the Paumarí shamanic snuff *koribó-nafuni* (*vide supra* and CHAPTER FOUR). The Tehuelche of southern Argentina smoke tobacco with *hierba mate*, *Ilex paraguariensis* ST.-HIL. (Aquifoliaceæ), while Yucatecan Mayans combined leaves of *Datura innoxia* MIL. (Solanaceæ), and «only under special circumstances» Peruvian Shipibo add stem-pith of kindred *Brugmansia* species to tobacco-infusions. Leaves from the moraceous genus *Pourouma* are also employed as cigar-wraps, while in El Salvador, the leaves of a *Dorstenia* species are smoked with tobacco to lend it «flavor» [Rätsch 1998A; von Reis Altschul 1973; von Reis Altschul & Lipp 1982; Wilbert 1987].

Though *Pourouma cecropiæfolia* MART. ex MIQ. leaves are occasionally burned for

ashes to mix with *ipadú*, kindred moraceous *Cecropia sciadophylla* MART. and other *Cecropia* species are the preferred ash-source. *Cecropia* leaves, widely known as *guarumа*, are smoked as marijuana-substitute in México. Cacao-pods are ash-sources for *coca*, also *Theobroma cacao* and *T. speciosum* WILLD. barks; fruits of *Trichocereus* cacti, *Diplotropis* and *Tachigalia* leaves (Leguminosæ) and leaves of a *Distictella* (Bignoniaceæ). Lecythidaceæ again figure—Makunas administer *ipadú*-powder *via* a clever fiber-bag *cum* bird-bone spout, made either of *Eschweilera* or *Ficus* bark (Moraceæ), and moraceous *Brosimum* and *Tabebuia* (Bignoniaceæ) species may be used as mortars in pulverizing the *ipadú* [DeWalt *et al.* 1999; Plowman 1981; Rivier 1981; Schultes 1981; Schultes & Raffauf 1990]. I might note parenthetically that *B. acutifolium* HUB. subsp. *ovatum* (DUCKE) BERG was recently reported as an initiatory «hallucinogen» among Amazonian Palikur- and Wayãpi-tribes [Duke & Vásquez 1994; Rutter 1990].

Of particular interest among numerous *coca*-additives [for a list: Rätsch 1998A] is *chamairo*, *Mussatia hyacinthina* (STAND.) SANDW. (Bignoniaceæ) liana-bark, which rather than flavoring salty quids renders these dulcent, often being chewed neat as *coca*-substitute; and Bolivian Tacana use *Sorocea* cf. *pileata* BURG. (Moraceæ) as *coca*-substitute [Davis 1983; DeWalt *et al.* 1999; Plowman 1980]. A «magical plant» used with *coca* by Colombian Paez-shamans is *tache*, «powerful» seeds of *Myroxylon balsamum* (L.) HARMS. (Leguminosæ) [Antonil 1978]. Another *coca*-substitute be *tabaco chuncho* or *Cordia nodosa* L. (Boraginaceæ), leaves of which are chewed by Campa Indians of Perú [Plowman 1980]. This plant is also known as *aya huasco* in the Peruvian Amazon [Rutter 1990]—suggestive of psychoactivity—whereas the fruit of *C. boissieri* DC. was cited from México in 1852 as having «intoxicating properties» [von Reis Altschul 1973], and the dried leaves of *C. millennii* BAK. are: «smoked as tobacco» in Africa [Andoh 1991]. Strangely, *C. stenodada* JOHNS. is today known as *nopo* in México [Lazos Chavero & Álvarez 1988], while the Miskitos of Nicaragua employ infusions of seeds and leaves of *C. alliodora* (RUIZ & PAV.) OKEN. as a stimulant [Coe & Anderson 1997]. Finally, two species of *Cordia* are known by the prefix *kurupí-* («divine», «divinity») to the (Tupí-Guaraní) Ka'apor near the mouth of the Amazon, this root of course being related to *Anadenanthera*, *viz.*: *kurupaí* [Balée 1989,1994].

In CHAPTER ONE I purposely eschewed discussion of ash-additives to *Anadenanthera* snuffs, in part because such may not be employed, and we have precious few *data*. However, in that case where we *can* identify the source of an ash added to *ñopo*-snuff, among Piaroa and other Salivan Indians, it is the bark of a lecythidaceous tree, *coco de mono*, which we know now either to be *Eschweilera tenax* (a species also called *cacao*) or *Couroupita guianensis* AUBL., which happens to be an *ayahuasca*-admixture [Luna 1984; von Reis Altschul 1972; von Reis Altschul & Lipp 1982]. We saw that the

Maué added «ashes of a vine» to *paricá* seed-snuff, and unspecified bark-ashes plus tobacco were added to *Anadenanthera* snuff along the Río Guaporé, whereas Yabutí added unidentified bark-ashes both to tobacco- and *aimpä* seed-snuff [von Reis Altschul 1972]. Biocca [1996] seems to describe addition of *Elizabetha* bark-ash also to Waiká seed-*epéna*. We have seen three major ash-sources for *Virola* snuffs: *Theobroma subincanum* bark (to Puinave-*yá-kee*; Sterculiaceæ); *Elizabetha princeps* bark (Waiká-*epéna*; Leguminosæ) and *Gustavia poeppigiana* bark (Witoto-*oo-koó-he*; Lecythidaceæ—also used for *Virola* resins are *Eschweilera* barks and *Theobroma* fruit-husks).

The appositely-named «folk pharmacopœia» additives to Amazonian *ayahuasca*-potions has already been examined with some care [Bianchi & Samorini 1993; McKenna *et al.* 1995; Ott 1999B]. While referring the interested reader to these publications for details on some 100 plants of 39 families, I wish to mention here additives from 15 such families, which encompass over half the plants in this pharmacopœia. Not only are the bulk of the principal South American plant-inebriants *ayahuasca*-admixtures, but taking also into consideration those plants important as admixtures and ashen additives to *ipadú coca*, tobacco, *Anadenanthera* and *Virola* snuffs, it will become evident that we are faced here with a single, archaic, intricately-intercalated, tropical inebriant-complex which is pan-South American, and indeed echoes down the broad and profound corridors of the past, to southern Argentina and Chile, and north through Mesoamerica, encompassing at least the tribes of northern California, possibly even those of the Northwest Coast. In the plaiting and interweaving of one entheogen with another, we can descry the likely cultural-evolutionary development of visionary shamanic pharmacognosy, which will be the subject of a future work.

Tobacco, manifestly, is the fundamental and irrecusable element of American shamanic entheognosia. Virtually no well-known American shamanic inebriant exists independently of some connection with tobacco, and it would seem that tobacco is the only shamanic inebriant claimed to stand alone in any culture, although I suspect this has much to do with the partial and incomplete evidence at our disposal. Without question, tobacco is a fundamental additive to *ayahuasca*-potions, and has a primary role, especially smoked, as animistic ægis or protective force during its elaboration and consumption, independent of conjectured pharmacological enhancement or synergy [Luna 1984; Luna & Amaringo 1991; Ott 1999B; Wilbert 1987]. Conversely, *ayahuasca* and a related vine are added to *ambíllyeralopatsa seri* tobacco-pastes. Like tobacco, both *Anadenanthera* and *Virola* snuffs are commonly taken in conjunction with imbibing *ayahuasca*, and *Virola* bark has been reported to be a specific admixture-plant in Perú [Luna 1984]. While as yet we possess no evidence *Anadenanthera* barks, leaves or seeds are added to *ayahuasca*-potions, we have

seen that the stems of the *ayahuasca*-liana might be chewed in conjunction with taking of *Anadenanthera* snuffs, and all but surely are at times powdered and added both to these and to *Virola* snuffs. Similarly, *ipadú coca*-powder is not only snuffed (*and* chewed) in combination with tobacco, but also with pulverized *Banisteriopsis* bark, and likewise is reported to be specific admixture to *ayahuasca*-brews, besides being taken commonly for buccal absorption with tobacco-pastes [Wilbert 1987].

The Leguminosæ family of *Anadenanthera*, moreover, is more than amply represented among *ayahuasca*-admixtures, with ten plants in nine genera, and where we have specific *data* on plant-parts used they are barks: of *Cæsalpinia echinata* LAM., *Calliandra angustifolia*, *Campsiandra laurifolia* BENTH., and either bark or roots of two *Erythrina* species. Turning for the moment to additive-plants *ayahuasca* has in common with its kindred, we find striking commonalities. Although *Justicia* leaves *per se* (common adjunct both to *Virola* snuffs and tobacco-pastes) haven't been cited as an *ayahuasca*-admixture, both likely co-occur in snuffs, particularly Waiká-mixtures of *epénas* in which either is found, and the family Acanthaceæ is represented by the addition of branches of *Teliostachya lanceolata* NEES var. *crispa* NEES to *ayahuasca*-potions [Schultes 1972]. Similarly, *Ilex guayusa* LOES. of the Aquifoliaceæ is added to *ayahuasca*, while its kin *I. paraguariensis* is smoked with tobacco. Tobacco, *ayahuasca* and *coca* share Bignoniaceæ bark-additives—*Tabebuia* species in the former two cases, and *Mussatia hyacinthina* in the last. Even 'though the source-plant for *ayahuasca* is itself a Malpighiaceæ species, the potions may have other malpighiaceous admixtures, as do tobacco and *Anadenanthera* and *Virola* snuffs—at least the leaves of *Stigmaphyllon fulgens* (LAM.) JUSS., *Diplopterys cabrerana* and possibly also *D. involuta* (TURCZ.) NIED. may be added [Schultes 1972; Schultes & Raffauf 1990]. There was a report of adding *Abuta* juice to *Anadenanthera* snuff, and I noted that *A. grandifolia* (Menispermaceæ) is admixed into *ayahuasca* [Luna 1984]. *Piper* leaves (Piperaceæ) are at once added to *ayahuascas*, to tobaccos and possibly to other shamanic snuffs. We've seen leaves of five species of Rubiaceæ (*Cephaælis*, *Guettarda*, *Palicourea* and *Psychotria*) are added to tobacco-pastes, while leaves of *C. williamsii* are smoked with tobacco in Colombia—leaves of at least a half-dozen species of *Psychotria* and of *Sabicea amazonensis* WERN. are added to *ayahuascas*, and (probably the leaves of) a *Guettarda* species plus other Rubiaceæ [McKenna *et al.* 1995; Ott 1999B]. *Brugmansia* (Solanaceæ) stem-pith is added to Shipibo shamanic tobacco-infusions; leaves are chewed with *coca* [Rätsch 1998A] and leaves of two *Brugmansia* species are amply documented as being *ayahuasca*-admixtures. Likewise, fruits of *chilelají* or *Capsicum* species may be added to *ayahuascas* as well as to oral and intranasal tobaccos and also *coca* [Schultes & Raffauf 1990; Wilbert 1987]. I've remarked the curious

case of that *coca*-substitute *Cordia nodosa*, known alike as *tabaco chuncho* and *aya huasco* in Perú, whereas *C. stenodada* is called *nopo* in Veracruz, México; and far away, two *Cordia* species are similarly associated linguistically with *Anadenanthera*, at the mouth of the Amazon, *via* the name-prefix *kurupí-*, among the Ka'apor, of a Tupí-Guaraní-idiom. Their kin, *Tournefortia angustifolia* ROEM. ex SCHULT. (Boraginaceæ), is a Siona-Secoya *ayahuasca*-admixture in Ecuador [Vickers & Plowman 1984].

Magnifying the optics of our focus to yet finer a level of detail—the species used as ash-admixtures to our three basic types of shamanic snuffs and *ipadú coca*—we discover still denser webs of interconnection. *Couroupita guianensis* or *Eschweilera tenax* of the Lecythidaceæ are the only known botanical source of ashes—as barks—for *Anadenanthera* snuffs, and the former is documented as an *ayahuasca*-admixture in Perú [Luna 1984]. Furthermore, we saw that *ta[h]uari* bark-papers of four genera from this family—*Allantoma*, *Couratari*, *Eschweilera* and *Lecythis*—serve widely as cigar- or cigarette-wrappers for tobaccos, and that bark-bags of *Eschweilera* or *Ficus* (Moraceæ) are used as oral syringes to administer *ipadú coca*, while bark-ashes of *Eschweilera* and allied *Gustavia* are key sources of «salts» combined both with *Virola* and tobacco-pastes. *Arrabidæa* and *Tabebuia* species (Bignoniaceaæ) are called *ta-[h]uari* too and used as bark-paper tobacco-wrappers, while barks of two species of *Tabebuia*, also known as *ta[h]uari*, are documented *ayahuasca*-additives, along with unknown parts of two other Bignoniaceæ [Luna 1984; McKenna *et al.* 1995]. Leaves of the related *Distictella* are *ipadú* ash-sources, and bignoniaceous *Tanæcium nocturnum* leaves are blended with tobacco in the Paumarí shamanic snuff *koribó-nafuni*. Leaves of a *Pourouma* species in the Moraceæ are also employed as cigar-wraps, and allied *Dorstenia* leaves smoked with tobacco in El Salvador. *Pourouma* and especially *Cecropia* leaves (Moraceæ) are primary ash-sources for *ipadú coca*, *Cecropia* leaf-ash being likewise used in Barasana tobacco-snuff, whereas at least three species of the allied moraceous genera *Coussapoa* and *Ficus* are *ayahuasca*-additives—apparently as latexes [Luna 1984]. The Moraceæ also includes the obscure Brasilian snuff *rapé dos índios* from *Maquira sclerophylla* fruits—with likely connections to tobacco and other snuffs—along with the recondite *takini*-latex of *Helicostylis* species, a sort of hybrid snuff/potion having an intimate connection to tobacco. We saw that fruits of *Trichocereus*, the *San Pedro*-cactus genus, were exploited as ash-source for *ipadú*, and two likely mescalinic cacti, of the genera *Epiphyllum* and *Opuntia*, are Peruvian *ayahuasca*-additives [Rivier & Lindgren 1972], while tobacco plus *San Pedro*-infusions be snuffed intranasally by Peruvian *mestizo curanderos*. By the same token, pods of *Paullinia yoco* (Sapindaceæ) provide ashes added to Siona tobacco-pastes, and the bark of this stimulant is likewise added to Siona-*ayahuasca* [Langdon 1986]. I noted

the intimate connection between leafen additives of the Rubiaceæ both to tobacco-pastes and *ayahuascas*, but we also saw that the bark of a *Capirona* species was used as an ashen additive to Tukuna tobacco-snuffs, and barks of *C. decorticans* SPR. and *Calycophyllum spruceanum* (BENTH.) HOOK. F. ex SCHUM. are added to *ayahuasca* in Perú [Luna 1984]. Ashes from barks or fruit-husks of cacaos (Sterculiaceæ) are added to snuffs *and* pastes of both tobacco and *Virola*—fruit-husk ash to *ipadú coca*—and inner-bark of a *Herrania* species was lately found added to Shuar-*natem*[a] (*ayahuasca*) [Bennett 1992]. Finally, returning to the Leguminosæ family of *Anadenanthera*, not only are numerous leguminous barks added to *ayahuascas*, but bark of the related *Elizabetha princeps*, *ama-asita*, is the invariable ash-source for Waiká-*epénas*, while for *chimó* tobacco-paste alkalinization, species of *Erythrina* are used. *Erythrinæ* are known commonly in Perú by virtually the same name as *E. princeps*, *amasisa*, including both species added to *ayahuasca*, *E. glauca* WILLD., and *E. poeppigiana* (WALP.) COOK. *Amasisa* likewise refers to *E. ulei* HARMS., also called *vilca tarwi*, which we saw at the outset was used like *Anadenanthera* (with which it has been confused) in Incan purgative enemas [Duke & Vásquez 1994; Rutter 1990; von Reis Altschul 1967]. *Vide* Rätsch [1998A] for his detailed discussion of the psychoactivity of *Erythrina* species.

We see thus clearly that every solo instrument in the South American shamanic symphony is represented *in nuce* in this extant *ayahuasca*-complex—leaves of tobacco and *coca* and *Virola* barks being added directly to the potions; *ayahuasca* liana-stems in turn added to tobacco-preparations and snuffs of *Virola* and *Anadenanthera*. All of the major ash source-plants and admixtures for *ipadú coca*, shamanic snuffs and pastes of *Virola*, *Anadenanthera* and tobacco—mainly of families Acanthaceæ, Bignoniaceæ, Lecythidaceæ, Leguminosæ, Moraceæ, Rubiaceæ and Sterculiaceæ—are either added *per se* to the potions or are supplanted by close proxies. This is anything but fortuitous or inadvertent, and a marked preference for specific plants as sources for ashen admixtures to snuffs is most decidedly *not* haphazard. Perhaps it's curious that ashes do not seem to be added to *ayahuascas*, as they are virtually to all other shamanic inebriants ('though Schultes and Raffauf [1990] noted *Brugmansia* leaf-ash as a Siona-additive); chemistry can account for this. Inasmuch as *ayahuasca*-brewing entails alkaloid-*extraction* into water, the presence of «basic» or *alkaline* ash would minimize solubility, acidity rather enhance it. Shamans are pharmacognosists and psychonauts, and far from amateurish or chemically unsophisticated. Where ashes are added to *Virola* snuffs or pastes, or to tobacco-pastes—likewise prepared by an aqueous extraction of the source-plants—these are added *after* the extraction process, during the final concentration-phase. Moreover, it appears probable to me that tobacco-ashes *are* in fact added to *ayahuasca*-brews. The constant smoking and

fumigation of and around the ebullient cauldron could certainly have as consequence some tobacco-ashes lofting into the lianine elixir [*vide* photographs: Luna 1986,1992].

SNUFFY PROBOSCIS OUT ON A LIMB: SNUFF–SYNDETICS, SYNECDOCHES

Forsaking the comforting physicality of potions and powders, I dare to venture into realms of airy speculation... smoky, if you will; perchance, in the famous words of Henry Thoreau: «mere smoke of opinion, which some had trusted for a cloud that would sprinkle fertilizing rain on their fields». To be sure, for the military or political tactician, «smoke-screens» perforce suffice *camouflage* or disguise, dissimulation or deceit. On the other hand, smoke—surely of tobaccos and other shamanic inebriants—has a long and fabled history as a catalyst to divination; destiny descried in its vatic vortices, capnomancy or perchance *fumispicy* (*via* analogy to *haruspicy*, definition of which I'd best leave to a curious reader's further inquiries). In his novel *Besuch auf Godenholm* (*Visit to Godenholm*), Ernst Jünger has beautifully described an ascending plume of incense-smoke as a fumatory ferment of vision, which amounts to much the same thing. By way of example, the northern Venezuelan Chaima burned bundles of tobacco on open fires, divining «through interpretation of the curls and spirals of the rising smoke» while Venezuelan Caquetio and Jirajara shamans rather divined by examining tobacco-ashes (spodomancy or tephromancy) following three days of smoking [Wilbert 1987]. Lovely classical Mayan lintels from Yaxchilán show graphically a queen descrying a «vision-serpent» in plumes of smoke arising from a bowl in which she'd apparently burned strips of bark-paper anointed with her blood after drawing a thorned-cord through her tongue [Schele & Miller 1986]! The most revered divinatrices of the classical world were the Pythia, affectionately known as the «Delphic Bees», whose abstruse mantic murmurings gave voice to the Oracle of Apollo at Delphi. While visionary inebriants were doubtless involved—mayhap inebriating honey or *apollinaris*, *Hyoscyamus albus* L. (Solanaceæ), or both, [Ott 1998; Rätsch 1987]—their vatic visions were had suspended over a fumarole in a cavern on Mt. Parnassos, whence issued fumes from the womb of Our Lady Gæa.

In the seven *vignettes* that follow, I'll make repeated reference to six major categories of American shamanic inebriants: *Anadenanthera* or ÑOPO-snuffs (Leguminosæ); *ipadú* COCA (Erythroxylaceæ); AYAHUASCA-potions (Malpighiaceæ); *Virola* or EPÉNA-snuffs (Myristicaceæ); *Nicotiana* or TOBACCO (Solanaceæ) and CACAO (Sterculiaceæ).

ASHES TO ASHES, DUST TO... DUSTED: PLANT-SPIRITS ON GUARD-DUTY—We have seen an irrefrangible consistency in the plants employed as ash-sources in the com-

mingling of shamanic snuffs, which has nothing to do with convenience or œcological abundance in any given place—why not simply, indeed, scoop-up some ashes from the hearth, always at hand and demanding no especial effort? Though we have scant *data* at our disposal regarding many ill-studied African shamanic snuffs, we can confidently assume that for African shamans, too, not just *any* old ash will do—with regard to TOBACCO-snuff comminution in Madagascar, Linton [1930] remarked offhandedly: «more attention seems to be paid to the ash than to the TOBACCO, two or three varieties being added in exact proportions». In American shamanic inebriants, the families Leguminosæ, Sterculiaceæ and Lecythidaceæ are by far the most important ash-sources, the first associated with all five inebriant-complexes (excluding here CACAO-potions, where no ash is used), the last two with four; the Moraceæ with two of the five. With regard to plant-additives to these inebriants, Leguminosæ, along with Malpighiaceæ and Solanaceæ, is again primary, all three families associated with all six inebriant classes; followed by Myristicaceæ (5/6), Lecythidaceæ and Sterculiaceæ (3/6) then Moraceæ (2/6). Two important conclusions might be drawn from this: first, that the families most important as ash-sources—especially the Leguminosæ—are likewise important admixture-sources; second, that there is extensive blurring of boundaries between our six inebriants; the families of ÑOPO, TOBACCO and AYAHUASCA intermingling with every one, those of EPÉNA and CACAO all but one.

In other words—at least symbolically—the plants chosen as ash-sources are, or bear some relationship to, important shamanic inebriants. I hasten to add, anticipating what would indeed be a captious objection, that in the plants under consideration, generally speaking of primal mythological import, folk-taxonomies are remarkably congruent with a botanist's. For all intents and purposes, the Quechua *cumala* and the Tupí-Guaraní *kaka[u]* or CACAO (and parallels in divers languages) are equivalent to Myristicaceæ and Sterculiaceæ. This holds alike for species of Lecythidaceæ and Moraceæ germane here, closely associated linguistically with TOBACCO or CACAO; as for the Malpighiaceæ, AYAHUASCA itself, *Banisteriopsis caapi*, intercalates with other inebriants. Key leguminous trees likewise form a distinct folk-taxonomic category, even for us, *viz.* «locust-trees». On the other hand—and equally portentous—there exists a singular and irrefragable linguistic intermingling of these various folk-*taxa*, to which I have by turns animadverted, and will document in greater detail below.

From a «die-hard doper» perspective (not that I would impute such to any of my readers—here, as always, I speak for myself), having weathered dope-droughts and dearths, it might fairly be asked: how can it be possible that a shaman/pharmacognosist should burn-up scarce and invaluable stash, simply to obtain ashes which are ever-abundant in any hut or *maloca*? The answer is stark and simple: the tutelary

plant-spirits, rather than assuming their didactic/inspirational role, *are here standing watch*. Nepheligenous TOBACCO-smoking during harvesting, infusion, repartition and ingestion of AYAHUASCA, as I have said, suffices as an animistic ægis, as a spiritual shield protecting the protean elixir, as able to work ill as good. Smoke, which is the visible, manipulable, halituous spirit of the plant made manifest, serves this lustral, protective role worldwide, and leaves behind it the irreducible material essence of a living being, its inorganic ashes—the body of the plant in fact entering into the comminution of the snuff, its fumacious spirit protectant, as wonders work in the alchemical alembic. If, as be true for COCA and TOBACCO, the alkalinity of the ash enhances alkaloid-uptake in mouth or nose, then the favillous plant-*body* materially works its miracles. A consistent and noteworthy feature of the confection of shamanic snuffs and *ipadú* COCA, is the fact that *the combustion of the ash-source is frequently contemporaneous*—as opposed to more «efficiently» preparing a large batch of ashes, to be laid-up and used as needed. This has been documented for *Virola* preparations [Schultes 1954,1969; Seitz 1967] and *ipadú* [Plowman 1981; Schultes 1981]—referring to Tanimuka *ipadú*, Schultes and Raffauf [1992] added: «there seems to be no reason for burning [*Cecropia* leaves] inside the houses»... unless this be plant-spiritual!

SHOOTING-UP: FROM DART-POISONS TO SHAMANIC SNUFFS—It doubtless surprised many to learn that at least for certain groups of Waiká Indians, dart-poison and visionary snuff are one and the same, the «poisoned» darts indeed being a handy and efficient means of snuff-storage. Attentive readers will recall that I noted the Waiká use the «blowgun»-method of snuffing, in which one person forcefully blows a snuff into another's nostril, *via* a *taboca* or snuff-tube 1–2 m long, similar to the *cerbatana* (*sumpitan*) or blowgun, being shorter and thinner, 'though probably having a wider bore. Dart-poison snuff suddenly seems a great deal less peculiar, especially when we reflect that a favored species for blowgun-manufacture is *pucuna caspi*, the *Virola* relative *Iryanthera tricornis* DUCKE [Duke & Vásquez 1994]. Significantly, we've two historical reports of apparently inebriating, non-lethal dart-poisons, antecedent to the disgraceful Usan «nonconventional chemical warfare» fiascos of the MKULTRA/ Vietnam-war era. In 1548, near Lake Maracaíbo in western Venezuela, *conquistador* Alonso Pérez de Tolosa described *cerbatana*-darts: «dipped in an herb which, wounding someone only slightly, would drop him senseless for two or three hours... after which he would arise in his five senses, absent other harm». In 1629 and much farther south, in the Río Caquetá of southern Colombia, a monk named Vázquez de Espinosa [1948] reported kindred *cerbatana*-darts: «on which they put an herb that is not deadly but only inebriates those wounded for 24 hours». I must take exception to Bisset's [1992] conclusions thereupon, in his excellent historical review of *curare*, to wit: that these records are consistent with the effects of Amazonian *curares*, typically based on extracts of the roots and barks of Loganiaceæ (*Strychnos* spp.) and Menispermaceæ (*Abuta*, *Chondodendron*, *Curarea* spp.) [Schultes & Raffauf 1990], and decidedly lethal. Bisset was apparently unaware of those reports from Roraima (not far from the site of Vázquez de Espinosa's chronicle) of inebriating snuffs/dart-poisons from *Virola theiodora* resin, which far better fit these citations of non-lethal, inebriating dart-poisons (Bisset rightly noted mistranslation in the English accompanying the first publication of Vázquez [in 1948], where «intoxicates» was given for *embriaga* [inebriates], but adds: «[this] means no more than «drunk»», which would be rather *bebido*, mayhap *embeodado* in 16TH-century Castillian). In Peruvian Amazônia, Reinburg [1921] cited a shamanic inebriant, besides AYAHUASCA and *huanto* (*Brugmansia*), *viz.*: *camalampi*, hitherto recondite. *Camalampi* probably referred to *Virola* resin, being «*cumala-ampi*», or «myristicaceous *curare*», in Quechua (*cama-* is found in common-names for *V. sebifera* [Aguirre 1971]), although *kamarampi* is Matsigenka *Banisteriopsis* [Shepard 1998]. Other shamanic inebriants are combined with *curares*: as TOBACCO-leaves and *Capsicum* fruits with Tikuna- and Shuar-*curare* based on bark of a *Chondodendron* [von Humboldt & Bonpland 1819]; *Brugmansia* and *Brunfelsia* in Perú [Castner *et al.* 1998]; Colombian AYAHUASCA-source *Tetrapterys mucronata* CAV.; Guyanan *Piper* root-bark [Bancroft 1769; Schultes & Raffauf 1990]. *Curare*-plant (bark and leaves) *Curarea tecunarum* BARN. & KRUK., was reported in Brasil *to be combined with* paricá-*snuff by the Maué Indians* [von Reis Altschul & Lipp 1982]; annotations to a voucher-sample state: «with the leaves of this Menispermaceæ, the Maué Indians toast the parica» (1971, from botanist Barbosa-Rodrigues). This came more than a century and a half after de Lincourt reported the Maué added leaf-juice, of an *Abuta* or other Menispermaceæ, and «ashes of a vine» to *Anadenanthera* seeds to make *paricá*-snuff (*vide* CHAPTER ONE), a solid confirmation! Intriguingly, menispermaceous *curare*-plants, of genera *Abuta*, *Chondodendron* and *Curarea*, as well as loganiaceous *Strychnos curare*-species, are commonly used in ethnogynecology (*e.g. Abuta grandifolia* root-tea as birth-adjunct in Ecuador; that species and *A. rufescens* AUBL. to treat sterility in Perú [Rutter 1990; Schultes & Raffauf 1990]; *Strychnos melinoniana* BAIL. as aphrodisiac in Surinam [Uphof 1968]); and these plants figure also as philtres in love-magic (in Venezuela, *S. jobertiana* BAILL. leaves are macerated in rum for perfume to attract the opposite sex [von Reis Altschul & Lipp 1982]). The species thus used are regarded among the strongest hunting-poison sources, which ought not surprise us—after all, the goal here remains hunting... love and romance on the one hand, or neonatal souls on the other. In Mesoamerica, women were given

toy-shields and -spears during parturition, and those that perished were deified, became *cihuateteo*, and were accorded funereal rites due a warrior fallen in battle; for in both cases, death occurred struggling valiantly to capture souls for the common weal [McKeever-Furst 1995; Ortíz de Montellano 1990]. The snuff-taking shaman, too, is often engaged in a hunt for a lost soul, and it is fitting that s/he be empowered for this task by hunting-poison administered *via* the weapon of the hunt, the *cerbatana*. Of course, hunting prey is first and foremost a sacred endeavor, the shaman's power key to its success, and Gorman [1990,1993] attests that for the Matses of Perú, a major purpose for taking *nu-nu*-snuff, is precisely to seek visions of prey-animals, so to facilitate their capture, or to «see» whether a remotely-set trap has been sprung. Not only are snuffs taken *via cerbatana*-like *tabocas*, but TOBACCO is smoked thus, *e.g.* among the Shuar—that end of the *taboca* packed with TOBACCO and a candent coal is placed in the mouth of a fumifugist, who perflates lunt *via* the fumiduct into or onto another person. Potions (now possibly spiritous), TOBACCO-juice and snuff-powders, like TOBACCO-smoke, may be blown by shamans onto bodies of patients [von Reis Altschul 1972; Wilbert 1987]. Sucking of the patient's body or head by shamans (*vide* Wasson [1968] for theory of remote Siberian origin) may be accomplished *via* a *taboca*, such as is used for snuff-insufflation or *-exsufflation*, smoke-inhalation or -perflation, blowing of visionary smokes, snuffs or elixirs onto or about a patient or potion... not to overlook launching deadly or incapacitating poison-darts at hunted quarry. Amazonian shamanic sucking, of course, is inextricably intercalated with notions of invisible psychic darts called *virotes*, «shot» by an evil *brujo* (sorcerer) into a victim; suction-removal and safe disposal of which is a primary function of *curanderos* (healing shamans). Both pathogenic and salutary shamanic power is thus mediated by shamanic inspiration and halitus through the *taboca*/*cerbatana*—alike alimentary weapon of the hunt and psychic conduit for plant-spirits; whether inhaled or exhaled as smoke, powder or fluid—viaduct of virulent *virotes* launched with a fnast of *mal aire* by the *brujo*; extracted *per* buccal suction by the *curandero*.

GUMMING SNUFF: TOBACCO-PASTES, SOLID ERRHINES AND VIROLA RESIN—In the EXCURSUS to CHAPTER TWO, I reviewed the partial and degenerate evidence for past shamanic use among the Bora and Witoto of «oral» bark-exudate «pastes» from *Virola* and *Iryanthera* species; also of *Virola* and *Osteophlœum* species among the Quijos Quichua. Schultes [1979] has remarked the tragic fact that elderly Bora and Witoto Indians, not having used *Virola* in shamanism during two generations, recalled how their «fathers and grandfathers» made the pastes and could demonstrate this, while «their knowledge of which species of *Virola* to use... [was] found to be unclear and

confused»! I suggest that they were also likely «unclear and confused» *as to the route of ingestion*, that these pastes were never intended to be swallowed, but either to be absorbed buccally (sublingually) or placed in the nostrils as solid errhines, a sort of time-release snuff, if not burned as incense. In seventeenth-century European medicine, errhines or intranasal medicines were either powders (a 1634 medical text stated: «drie errhines are to be blown into the nose with a pipe or quill») or balls of lint steeped in a medicinal fluid. Paul Reclus' 1903 manual on cocainic local anæsthesia described as errhine: «a small plug of cotton saturated with cocaine» to arrest nasal hemorrhage, and there is still another type of errhine, bougies—solid nasal suppositories. In 1711, André João Antonil cited a Brasilian use of TOBACCO-pellets inserted into the nostrils, stressing the resulting meldrop: «the pellets, being discharged from the nostrils and the drop of snot... soil the chin and nauseate the person with whom one is speaking». Mesoamericans likewise made *yiaqualli*, TOBACCO-pellets which might have been used as errhines. In 19TH-century pharmacies, errhines were compounded of pure compounds, and the U.S. Pharmacopœia of 1893 and the National Formulary of 1895 included PULVIS ANTICATARRHALIS, N.F., «Catarrh Snuff», a mixture of morphine hydrochloride, bismuth subnitrate and *Acacia catechu* L. F. powder [Remington 1894], whereas W. Martindale [1886] compounded cocainic nasal bougies for hay-fever. As for *Virola*, we also know *Virola* resins are used in Amazônia buccally, to treat inflammations/infections, and also rubbed onto the gums to treat childhood teething-pains [Duke & Vásquez 1994; Schultes & Raffauf 1990]; Wayãpi might treat malaria with an ethereal errhine of volatile oil of *V. surinamensis* leaves, containing safrole [Lopes *et al.* 1999]. The Bora and Witoto still confect *ambíl*/*yera* TOBACCO-pastes, *applied to gums* with a stick, often from a CACAO-fruit gourd, and I cited the parallels between TOBACCO- and *Virola*-pastes, down to the fine detail of use in both of an evaporated ash-leachate «salt» from specific plants. Only in World War II did TOBACCO-smoking gain the upper hand in these United States, where chewing-TOBACCOS had formerly characterized the habit, and be still of commercial importance, today labeled as «snuffs», that are rather taken buccally, which is called «snuff-dipping», and there are many accounts of fashionable ladies in 19TH-century Virginia rubbing powdered TOBACCO onto their gums with brushes, employing elegant snuff-boxes. As for contemporary citified *chimó* TOBACCO-paste in Venezuela, *chimó* is rendered to a consistency rather like taffy, and for use: «an amount... about the size of a pea is placed in the mouth with the index-finger, to adhere to the inner surface of the lower front teeth», although it may be applied with a spatula yclept *paletica* or *pajuela*. The *chimó* then dissolves, and a bioassay suggested absorption was essentially sublingual [Kamen-Kaye 1971,1975]. I suspect that the elderly Bora

and Witoto Indians who informed Schultes about *Virola* pellets, and knew how to make them but not precisely from which species, had as children seen their «fathers and grandfathers» put the pellets into their mouths, and so assumed that they had swallowed them, when in reality they were allowing them to dissolve in the mouth, for sublingual absorption of their contained tryptamines (*vide* CHAPTER FIVE). D. J. McKenna [*et al.* 1984B] assayed (by oral ingestion) four different *Virola* paste-samples from Perú and Colombia, two of which were without activity (one having been alkaloid-free; the other with only traces of DMT). Peruvian *Virola sebifera* paste containing 1.32% 5-MEO-DMT and 0.38% DMT showed only the mildest of activity; while one Peruvian *V. elongata* paste (containing 1.57% 5-MEO-DMT): «elicited a rapid and profound response... characterized by considerable physiological distress rather than the perceptual and psychological [effects] typical of hallucinogens». McKenna ingested 1.5–2.0 g of this *ku'-ru-ku*-sample, corresponding to 23.6–31.4 mg 5-MEO-DMT, which would surely have been active sublingually, being thrice the threshold-dose (and perhaps subthreshold orally). It apparently hadn't occurred to the paper's authors that *ingestion route* was also an area in which the informants' memories were «unclear and confused», and thus the sublingual route was not investigated psychonautically. They had sought a putative β-carboline-mediated, AYAHUASCA-type oral activation of tryptamines in the pastes, which their results did not support, indeed more or less disproved, and it seems strange to me that two pages of discussion were devoted to hypotheses of convoluted alternate mechanisms for oral-activity of tryptamines—despite the fact that bioassays had not found such in the pastes—and the qualification at the end of the abstract—«if they are, in fact, orally active»—belongs also at the end of the final sentence of the article. I think the evidence is quite clear that «orally-ingested myristicaceous pastes» is a misnomer, and that they should be called «sublingual» rather than «oral». I deem as remote the possibility that the Boras and Witotos inserted these pellets intranasally as solid errhines, inasmuch as such a detail would surely have been recalled by their children, even in old age. However, insofar as rhinal use of TOBACCO-pellets is reported from South America, we cannot discard this as a possible route of ingestion of *Virola* pellets in another time or place. I might animadvert parenthetically to linguistic blurring between these *Virola* species and the CACAO-species used with them as ashes: *V. sebifera* and *V. guatemalensis* (HEMSL.) WARB. are known as *jungle-cacao* and *flying cacao* (*cacao del monte* and *cacao volador*), *Iryanthera juruensis* WARB. as *wild cacao* (*sacha cacao*); whereas *Theobroma cacao* and *T. subincanum* are conversely known as *cumala* [Aguirre 1971; Bennett & Alarcón 1994; Duke 1981; Rutter 1990]. I already remarked that the Witoto name for *Virola*, *oo-koó-na* (*úkuna*), means «jungle-TOBACCO» (being at least consistent with my hypothesis that similarly-made Witoto *Virola* and TOBACCO-pastes were also similarly ingested), and we see these rain-forest denizens also to be known as «jungle-cacao». TOBACCO, I must add, is *not* native to Amazônia, its omnipresence there being strictly as a cultigen [Goodspeed 1954], and this is an aggressive, weedy annual, easily escaping cultivation and frequently agrestal. In this context it is more than salient that the use of *Anadenanthera*—like TOBACCO exotic in Amazônia—has also penetrated completely the length and breadth of this vast œcosystem, its family that most universally represented, both as admixtures and ash-sources for other inebriants. Finally, I referred early-on to a mysterious resin, grated and used as a shamanic snuff in Colombia. Schultes [1954] thought there were a slight possibility this be *V. bicuhyba* resin, which we saw in CHAPTER TWO is reputed to be a «brain stimulant» in Brasil; the seed of the tree—tentatively containing bufotenine—a «narcotic».

THE ENIGMA OF AMAZONIAN JUREMA—In CHAPTER ONE I made mention of a once-widespread complex of potions known generically as *vinho da jurema*, and based on cold-water infusions of pounded root-bark of *jurema preta*, *Mimosa tenuiflora*, plus at least 11 *juremas brancas*, other Leguminosæ (*Acacia*, *Mimosa*, *Piptadenia*, *Pithecellobium*). The territory of *jurema* is the *caatinga* of northeastern Brasil, œcologically as different as can be from Amazônia, so it is more than surprising there were 18TH- and 19TH-century citations of *jurema*-use in western Amazônia, climatically and geographically worlds away from its home! Schultes [1978] reviewed these obscure reports, which placed Amazonian *jurema* among the Amanajóz Indians of the Río Negro in 1843 (noting specifically the key detail that the potion was made from the *roots* of the *jurema*-tree), a Jesuit missionary having ascribed such use to many tribes. Schultes dismissed these reports out of hand, as «most certainly erroneous and confused». Although he noted that the Amanajóz and other peoples had migrated to Amazônia from northeastern Brasil at the end of the 18TH century, he asked rhetorically: «where could these Indians have found *jurema* roots in their new and very different environment?». Information not available to Schultes when he wrote this paper suggests at least two convincing answers to his rhetorical question. Botanical studies [Barneby 1991; Grether 1988] are in accord that the primary source for *vinho da jurema*, *jurema preta*, previously ascribed to *Mimosa hostilis*, is *not* endemic to the northeastern Brasilian *caatinga*, but rather occurs in disjunct populations from Bahia, Brasil, north—at least to the Mexican state of Oaxaca, where it is common and abundant. Indeed, the tree was first collected in Venezuela in 1806, as *Acacia tenuiflora* WILLD., and later in Colombia in 1863, as *Mimosa cabrera* KARST., after its common name there, *cabrera* or *cují cabrera*. The first Brasilian collection was in 1823,

as *Acacia hostilis* MART., which Bentham transferred into *Mimosa*—the correct botanical synonym for all these is *M. tenuiflora* (WILLD.) POIR. Since western Amazonian tribes have been able to obtain *Anadenanthera* seeds also from habitats remote and divergent from theirs, it follows that they could also similarly have obtained roots of *jurema preta* from interior Venezuela or northern Colombia, where it is not uncommon. As a matter of fact, the ranges of *M. tenuiflora* and *Anadenanthera peregrina* var. *peregrina* overlap in those countries, as also be the case between the former and both varieties of *A. colubrina* in northeastern Brasil; habitat and altitude preferences for all four being congruent. Indeed, it would appear that with respect to folk-taxonomy in Brasil, no significant distinction is made between *juremas* and *angicos* (the name most commonly associated with *Anadenanthera*). Inasmuch as there exist *angicos brancos* (*Piptadenia* and *Pithecellobium* spp.), perhaps there are also *angicos pretos* («black»), and von Reis Altschul [1972] noted without especial comment that where *angico* begins to give way to *paricá*, as common-name for *Anadenanthera*, around the mouth of the Amazon, it is indeed called the «black *paricá*» or «false *paricá*», *paricáramá*. In Brasil, *Mimosa* species are called «little *angicos*», *angiquinho* or *angiquín*, and where the names overlap, both *Acacia* and *Pithecellobium* species are known as *paricá* or *paricá grande*. Taíno-*cohoba* (Guaraní-root [Williams 1930]) for *Anadenanthera* exists in Brasil as *cuhuba* for *Piptadenia tocantina*, while in Colombia, *choiba* and *yapo* are a likely *chimó*-additive, *Dipteryx panamensis* (PITT.) REC. & MEL.; in Panamá, *choyba* is also a *Helicostylis* species (Moraceæ; doubtless one of the species yielding visionary *takini*-latex), and in Perú the *Anadenanthera* name *kurupá* can also refer to a Yagua *Brugmansia* species! We have already seen that the Quechua *vilca*, closely associated with *Anadenanthera*, also applies to *Erythrina ulei* or *vilca tarwi*, possibly taken jointly with the former in purgative enemas, whereas two species of *Banisteriopsis* are called *huillca bejucos*, «*vilca*-lianas», and it has been suggested that *wircawei-yek*, a Venezuelan name for *Virola sebifera*, inner-bark of which was «smoked by witch doctors [*sic*]», likewise is related to the *vilca*-phoneme. Oddly, *angico* is also a name for *Guettarda* (Rubiaceæ, one species of which is added to AYAHUASCA) in Brasil. I've already remarked the strange parallelism between *ajucá* as a Pancarurú name for the *jurema*-potion, and *acujá*, a Yekuana-snuff on the Río Ventuari, which could well have been from *Virola surinamensis*, called *cajucá* in the Caribbean (we saw that a boiled-bark inebriant from *V. elongata* was known as *akurjúa* in Yekuana). There are similar significant overlaps in Colombian folk-taxonomy, and *cují* would seem to be equivalent to *angico* or *paricá*—I noted *Mimosa tenuiflora* (*jurema preta*) is called *cují cabrera*, but *cují*, *cují cimarrón* (or «wild») and *cují hediondo* («fœtid») apply to various *Acacia* species, the last also to *Piptadenia*. Farther north, this word

changes into *cujiniquíl* in El Salvador, or simply *jiniquíl* in México, for *Inga* species, snuffed with tobacco by Makunas [*vide* CHAPTER FOUR, *Dimorphandra*]. *Ta[h]uari*, for lecythidaceous/moraceous bark TOBACCO-papers, is also AYAHUASCA-admixture *Vitex triflora* VAHL (Verbenaceæ)—*Vitex agnus-castus* L. represents the *only* non-leguminous *jurema* (*branca*) in Brasil, where it is known to be used as ethereal errhine [Aguirre 1971; Barneby 1991; Duke 1981; van den Berg 1993; von Reis Altschul 1967, 1972,1973; von Reis Altschul & Lipp 1982]! These linguistic *minutiæ* set the stage for a second answer to Schultes' rhetorical question: where might Río Negro Amanajóz have obtained *jurema*? Mayhap they used *jurema* for *Anadenanthera* roots, as opposed to *Mimosa*/*Acacia*/*Piptadenia*/*Pithecellobium*—after all, unless they had traveled to the interior of Venezuela or northern Colombia, how might they have known that their beloved *jurema preta* abounded there? There appears to be no sacred aura suffusing *Mimosa tenuiflora* in northern South America, neither in Mesoamerica, where I've looked assiduously for this. In fact, *jurema preta*, called *tepexquáhuitl* or «ravine-tree» in Náhuatl, as *tepescohuite*, is presently perhaps the most famous Mexican ethnomedicine, object of a significant export-industry, related to prosaic, not numinous, uses as a topical vulnerary and a base for all manner of shampoos and cosmetics, employing only the stem-bark, which contains merely 0.3–3% the DMT-content of the root-bark used in *vinho da jurema* [Meckes-Lozoya *et al.* 1990]. In the light of current knowledge, Schultes' out-of-hand dismissal of Amazonian *jurema* seems premature, and I see no reason to doubt this, especially considering the word *jurema* has crossed the breadth of the Amazon, where it is today still used in Perú for one specific *jurema branca*: *Pithecellobium tortum* MART. [Rutter 1990]... which is where I reluctantly must take leave of *jurema* for the nonce; noting that many seemingly loose-ends here will be tied-up into a meaningful and beautiful package in a future work.

SYNCRETIC AYAHUASCA-COMPLEX AS ETHNOMEDICINAL MIDDEN—Much verbiage has been lavished on AYAHUASCA which, as noted at the outset, is the entheogen *en vogue* in the contemporary «shamanic scene». Lately the preponderance of writing is more mythological than scientific, and there has been a marked exaggeration of syncretic, *mestizo* AYAHUASCA-folklore of Amazonian Perú (centered around urban Iquitos, Pucallpa and Tarapoto), thanks to extensive ethnographic work in this area by my friend and colleague Luis Eduardo Luna [1984,1986,1991,1992]. Also exaggerated in contemporary AYAHUASCA-consciousness are the practices and ideologies of modern syncretic AYAHUASCA-based cults from Brasil, notably SANTO DAIME and the UNIÃO DO VEGETAL, which are, after all, churches and not scientific academies [MacRae 1992; Ott 1995B,1999B]. Exemplary of modern AYAHUASCA-mythology, publi-

shed doctrine of the UNIÃO DO VEGETAL [Anon. 1989], while acknowledging founding of the sect on 22 July 1961 by José Gabriel da Costa, claims *de facto* origin in the Israelite kingdom of Solomon, 10TH century B.C., then a «reappearance» in 5TH–6TH century Perú, «in the Incan civilization», which the most liberal genealogies of only 13 precontact Incas (the word referring to the royal line of descent) extends no earlier than 1021 (Manco Ccapac)—deemed by Prescott [1847] wishful thinking, he fixing a more likely founding of the dynastic civilization about 250 years before the arrival of Pizarro, or late in the 13TH century—while Solomon is considered a fictional Biblical character by many archæologists. Similar attempts to assign patents of archaic lineage to AYAHUASCA are based purely on conjectured uses of ceramic vessels, pursuant to the fallacious assumption: «use of the *ayahuasca* must have come long after the invention of pottery as the plant has to be boiled in a clay pot before use» [Naranjo 1979,1986]. In the realm of science but nonetheless redolent of wishful thinking—some loath to attribute a sophisticated pharmacognostic discovery to bands of bare-assed Indians—are theories of Hindu *Ayurhuasca*, Mesoamerican *Mayahuasca*, and the like. As we shall see below, there *was* a Mesoamerican «*ayahuasca*», but based on CACAO-potions and alcoholic *chichas* (*balché*/*octli*/*pulque*), not *Banisteriopsis*, and although *B. muricata* (CAV.) CUATR. grows from Argentina to Chiapas, México [Gates 1982], trace alkaloid-content and patent lack of sacred aura illuminating this shrub/liana in Mesoamerica argue against its use there as an entheogen. *Pace* Naranjo's assumption that ceramics were a prerequisite to AYAHUASCA-brewing, probably the most archaic method for infusing AYAHUASCA-potions is by kneading of the crushed liana-stems or bark in cold water, precisely the way *vinho da jurema* was made traditionally; according to Schultes and Raffauf [1992], the most common technique of AYAHUASCA-infusion in the Colombian Amazon. Reichel-Dolmatoff [1970] likewise described this simple technique among Colombian Tukano Indians, stressing that there was no boiling, just cold-water infused AYAHUASCA: «unmixed with the leaves or with other ingredients»; Schultes and Raffauf adding that «occasionally» plant-admixtures were added in Colombia. Reichel-Dolmatoff's extensive studies of Tukanoan mythology [1971,1975,1996A,1996B] make manifest that simple, cold-water-infused *Banisteriopsis* potions are indeed archaic, are intimately related both to TOBACCO and COCA, and surely are not called (H)AYAHUASCA (Quechua: «*coca*-liana»), but rather *gahpí* (COCA is *ahpí*) in Desana (*caapí*, whence its botanical name; also: *capí*, *cabí*, *cají*, *kahí*). This term is Tupí, probably most archaic, whence derive cognate names. Naranjo [1983] proposed as the etymology: «exhalation-leaf», *viz.*, that makes one vaporous spirit, noting this points perhaps to primordial use of the *leaves* by Tupí peoples. I've said *Banisteriopsis* leaves and bark are still smoked by Witotos;

leaves are occasionally added to AYAHUASCA-potions, and the only quantitative analyses we have for *Banisteriopsis* leaves found five Peruvian samples to have on average 0.72% alkaloids, *better than double* the average content found in 15 stem-samples, including 4 of the strains from which leaves were analyzed [Rivier & Lindgren 1972]. At least for some tribes, the word *yajé* applies specifically to the *Banisteriopsis* LEAVES [Pinkley 1969]. Naranjo [1983] determined that AYAHUASCA was a neologism, dating no earlier that the 18TH century, noting that Quechua-speakers never colonized the areas where *Banisteriopsis caapi* is indigenous, nor did those few attempts of the imperialistic Incans to subdue Amazonian peoples prosper. Luna [1986] enumerated 72 tribes reported as having used *Banisteriopsis* potions, of which merely 5 (or 7%) are Quechuan. On the other hand, 16 (22%) are Tukanoan while 13 (18%) Arawakan—the major areas of these two linguistic groups being congruent in the northwestern Amazonian interface between Colombia, Venezuela and Brasil. If we add-in the 9 (12.5%) Panoan tribes, we've better than half of the known users of *Banisteriopsis* potions; ¾ of whom reside in a discrete area where pharmacognostical, mythological and linguistic details suggest such *brebajes* are most archaic. Just south of this area, in the central–upper Amazon, is the major stronghold of Panoan tribes that use *ayahuasca*, interspersed with Arawakan tribes, as well as the only two Tupí-tribes reported to use these potions, the Omagua and Cocama (recall that the commonest name for the potions in northwest Amazônia—*caapí* and derivatives—stems from a Tupí-root). It is no coincidence 58% of AYAHUASCA-using tribes from these four groups also ingest *Anadenanthera* and/or *Virola* snuffs (which ratio is 68% if we include TOBACCO-snuffs, too) nor that major names in this area for *Banisteriopsis* and visionary snuffs are Tupí-Guaraní. I wish to note that Guaraní-speakers from mid-Amazonian Brasil call «*ayahuasca*» *jaúma*, closer linguistically to *jurema* than any other known word for *Banisteriopsis* (save *Juramidam*, Santo Daime-name for the female spirit of AYAHUASCA [Polari de Alverga 1999]), and that Colombian *cují*, for *jurema*, is close to *cají* for *Banisteriopsis*. Which strengthens my conviction—which I'll substantiate anon—that archaic *Banisteriopsis* potions be Tukanoan-style, simple cold-water infusions of liana-bark or -stem *sans* additives, or with but few, in any given tribe, an «Amazonian *jurema*»; that the «*ayahuasca*-effect» (tryptamine:β-carboline synergy) *is* in fact the «*paricá*-effect», having been arrived at quite naturally *via Anadenanthera* snuffs (in which *Banisteriopsis* may still be mixed, else co-ingested) and *jurema*-potions—confected from like trees, confounded in folk-taxonomies, from the same habitat. Conversely, the prodigious «folk pharmacopœia» of *metizo*/Quechuan (although some of the best Peruvian practitioners I've met are monolingual Castillian-speakers who have no social or linguistic connection to any particular indigenous

group) AYAHUASCA is probably no older than is the word, going back at most three centuries, however faithfully based on snippets of indigenous entheobotany culled here and there from refugees of many cultures, some long-extinct. It is, as Luna and Amaringo [1991] have graphically and carefully documented, a syncretic phantasmagoria of polyglot Amazonian traditions, esoteric Christianity... travelers' tall-tales, out-and-out science-fiction, and not a little experimentation and improvisation, to which I myself have willingly contributed. Above all, it is a species of ethnomedicinal midden, in which plait and intertwine truly archaic strands of the vast, portentous and exquisitely-detailed tapestry that is South American shamanic pharmacognosy.

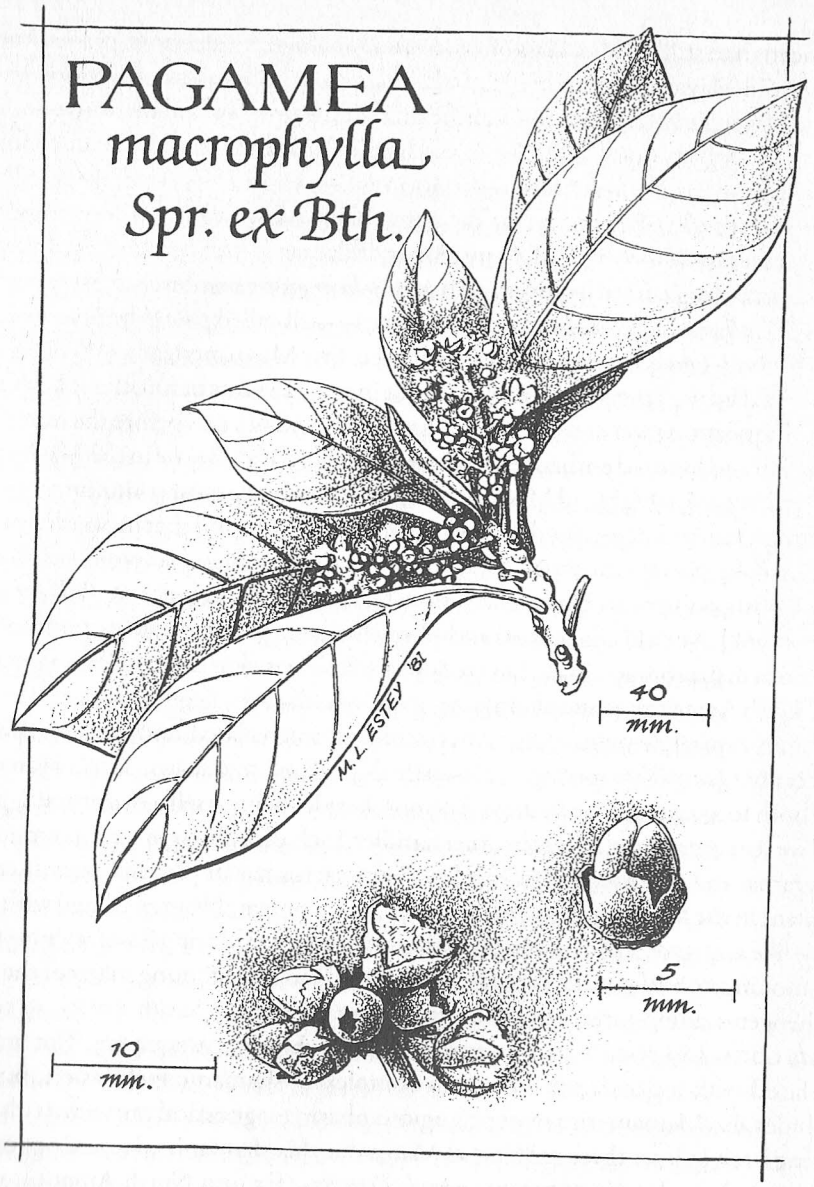
BARKING-UP THE WEIRD TREE: PUKA-LUPUNA AND SAMÍKI—I trust it would not be asking for too much indulgence on the part of you long-suffering readers, were I to poke my nose into a decidedly arcane knot-hole in the Tree of Life; one in which, moreover, this literature is in a bit of a muddle, which I can hopefully put to rights. Rafael Karsten [1964], working amongst the Peruvian Shipibo, unearthed some shamanic lore as fascinating as it is bizarre, concerning TOBACCO and a «demon» in the *lupuna*-tree. It seems evil *brujos* would place crushed TOBACCO-leaves, «thoroughly mixing them with saliva», into a *ronkon*—a sort of pot that «with the ceremonial tobacco-pipe, forms his most important equipment»—which in turn was inserted into a «deep cavity» carved in the trunk of a *lupuna*-tree, covered with bark, and left overnight, after which «the poisonous medicine [was] ready to be used for magical purposes». *Evil* magic, so it would seem, as an «evil demon» called *joshín* is the spirit of the tree, «particularly active in its poisonous sap». It's been assumed that Karsten's *lupuna* was *Ceiba pentandra* (L.) GAERT. (Bombacaceæ) or the kapok-tree, known indeed by that name or more precisely, *lupuna blanca*, especially esteemed as a source of kapok used as fletching for hunting-darts—this is almost certainly a mistake, as we shall soon see. But first I must note that Luna [1986] documented a similar practice in Peruvian *mestizo* shamanism, regarding an «oar-tree», *remo caspi*. In this case, a small bowl of TOBACCO-juice was likewise put in a cavity in the trunk, sealed with mud-daubed bark, then left for eight days, following which the shaman would see visions of animals on the surface of the contents, that he was obliged to drink, on pain of certain death, and which draught would cause him to lose consciousness for 12 hours, during which the plant-spirit would «teach him many things». Luna identified *remo caspi* as *Pithecellobium lætum* BENTH. (but this name could apply to other leguminous trees, *viz. Swartzia*, or apocynaceous *Aspidosperma*), and cited Karsten's account of *lupuna*, which he identified with *Chorisia speciosa* ST.-HIL. (Bombacaceæ); adding that in an earlier paper he had suggested *Ceiba pentandra* and *Trichilia tocacheana* D.C. (as *Troclilia tucacheana*, Meliaceæ) as tentative identifications, settling on *Cavanillesia hylogeiton* ULB. or *C. umbellata* RUIZ & PAV. (Bombacaceæ) for *puka-lupuna* or *lupuna colorada* («red»). I agree with Luna that his evidence points to the Bombacaeæ—*either* a *Cavanillesia* or *Chorisia*—and agree that Karsten's report *also* relates to one of these *puka-lupunas*. Unfortunately, Luna's early, tentative assignment of *lupuna* to *Trichilia tocacheana* (bearing this common-name in Perú), subsequently retracted (being based on common-name association and *not* botanical studies), has been perpetuated in the literature; it appears Schultes and Raffauf [1990] not merely repeated it, but mixed-up Karsten's report *in re* TOBACCO + *lupuna*-sap, and Luna's conjecture that the latter were *Trichilia*, accreting the detail that «tobacco juice with *ayahuasca*» was put into the *lupuna*-trunk, when both Karsten's account of *lupuna*, and Luna's of *remo caspi*, involved *only* TOBACCO-juice, which Luna says was drunk neat, Karsten citing only suitability for evil magic. As so often happens when a deservedly much-cited authority errs, this mistake has taken wing, and *T. tocacheana* appears in two lists of AYAHUASCA-plants, for which I know no solid evidence. I wish to justify my conviction that Karsten's report refers not to *Ceiba* but to its relatives *Cavanillesia* or *Chorisia*, likewise why I regard the latter to be *puka-lupuna*. *Chorisia insignis* HBK is called both *palo borracho* («intoxicating tree») [Uphof 1968] and *lupuna* [Duke & Vásquez 1994]—in Ecuador it's believed to be a repository for *virotes* or pathogenic shamanic darts, hence parlous and assiduously avoided [Paymal & Sosa 1993]. *Chorisia speciosa* is known as *lupuna* to Peruvian Matsigenka [Baer 1992], and although Illius [1992] ascribed Shipibo-*lupuna* to *Ceiba pentandra*, this was in reference to the evil *joshín* (*yoshin*), noting: «the lupuna tree has one of the mightiest and thus most dangerous spirits known to the Shipibo». Again, this hardly refers to the benevolent «white» *lupuna*, *C. pentandra*, but to one of our *puka-lupunas*, *Chorisia* or *Cavanillesia*. *Ceiba samauma* (ULB.) BAKH., *Ficus* sp. and *Dipteryx odorata* (*chimó sarrapia*) cause Tacana soul-loss; *Ochroma pyramidale* (CAV. EX LAM.) URB. (Bombacaceæ), *Batocarpus costaricensis* STANDL. and *Clarisia racemosa* RUIZ & PAV. (Moraceæ) suffice hunting magic [DeWalt *et al.* 1999]. A Colombian *Cavanillesia* is called *ceiba bruja*, «bewitching *Ceiba*»; in Perú, *puka-lupuna* applies both to *C. hylogeiton* and *C. umbellata*, while the latter is called *lupuna bruja*, the same name we see in Colombia [Duke & Vásquez 1994; Rutter 1990]. Wassén [1979] noted C. Lévi-Strauss' 1950 mention of a Nambicuara-«magical poison» which consisted of the *resin* of a bombacaceous tree called *barrigudo* («pot-bellied»)—to the Xucurú *jurema*-users of Pernambuco, Brasil, the *barrigudo*-tree is *Chorisia speciosa* [Hohenthal 1950]. Averring the while there is method to all this madness, I change my subject, noting lastly that *Erythrina ulei* (both *vilca tarwi* and *amasisa*) is known also as *ceibo* from Bolivia to

Colombia [de Lucca & Zalles 1992; Duke 1981]. If *lupuna* ben't weird enough for the more *outré* of any readers perchance still with me, let's try a few *samíki*-rings on for size. Karsten [1920] also recorded that the Shuar (Jívaro [*sic*]) added to *natem*[a] (AYAHUASCA) barks of two trees known as *shingiáta* and *samíki*, which he failed to collect or identify botanically, both being 'til now obscure. *Samíki*-bark was intimately associated with the vision-quest attending the slaying of a victim, whose head was to be shrunk. The particulars, recorded by Karsten [1935], are bizarre indeed. After snuffing TOBACCO-juice, the shaman holding his wrist the while, the slayer crushed with a club a section of *Banisteriopsis* stem, the shaman guiding his hand to put the resulting pieces into the cauldron, likewise adding water. The shaman then guided the slayer's hand (later that of his wife, then daughter) in placing a TOBACCO-leaf first atop, then into a small pot, to which water was similarly added, before positioning it on a fire separate from that on which the slayer had put the *Banisteriopsis* to boil. Two strips of *samíki*-bark and a section of manioc-stem lay beside the cauldron. By turns, the slayer wrapped the strips 'round his index-finger and tied them into rings, each attached to the manioc-stem *via* a loose-end of the knot. His hand guided by the shaman, the slayer then placed the manioc-stem with two *samíki*-rings atop the TOBACCO-pot boiling on the fire, later to be poured by the slayer, wrists held by the shaman, into the *natem*[a]-cauldron, completing the sacred potion to be drunk in the «victory feast» celebrating the taking of the head. According to Karsten, the *samíki*-rings served to transfer to the TOBACCO-potion, thence the *natem*[a], the «supernatural power» with which the slayer was imbued. Whoever desired to partake of the potion could do so, even half-grown children, and it was thought that the *samíki*-rings also transferred power to the manioc-stem, so that all who «dreamed» might see flourishing manioc-fields—the objective being augury of the slayer's future. Thanks to assiduous field-research among the Shuar by my friend and colleague, the Catalán ethnographer Josep M. Fericgla [1994], we finally know what *samíki* is, «one of the plants most frequently mixed by the Shuar with *natem*[a]... it has an important neurochemical action in the ecstatic and visionary mental state provoked by the potion. *Calliandra pentandra*» (Leguminosæ; it might be *C. angustifolia*, which we've seen in a known AYAHUASCA-additive). Fericgla kindly provided me with seeds of Shuar *samíki*, one of which I was able to germinate—my interest being conservation and bioassay/analysis, *not* head-hunting! An association of *Calliandra* with *Banisteriopsis* may survive as far north as Guatemala, where I remarked *C. calothyrsis* is named *yajé*, and a linguistic association between *Calliandra* and TOBACCO is recorded from the Dominican Republic in 1940, *C. hæmatostoma* being called *tabacuela* there, or «little tobacco» [von Reis Altschul 1973; von Reis Altschul & Lipp 1982]. Finally, it appears

that Karsten's *shingiáta* bark-additive to *natem*[a] is yet another species of *Calliandra*. A 1931 botanical collection of *C. amazonica* from Perú recorded its name: *shingata* to the Aguaruna, a tribe subsumed under Karsten's «Jívaro» [von Reis Altschul 1973].

CACAO VOLADOR: FROM AMAZÔNIA TO AZTLÁN—We have seen that two species of *Virola* and one of *Iryanthera* might be called CACAOs in South America, and it comes as no surprise that seeds of *V. guatemalensis* or *cacao volador* («flying») are used for «flavoring» chocolate-potations in Central America [Duke 1981]. Beverages made from *seeds* of *Theobroma cacao* (secondarily *T. bicolor* and *T. angustifolia* MOC. & SES.) originated in Mesoamerica, whereas in South America, each of these, along with *T. grandiflorum* (WILLD. ex SPRENG.) SCHUM. and other species, were rather exploited for beverages made from the juicy pulp surrounding the seeds, themselves not used. Surprisingly, *T. cacao* is of western-Amazonian origin, but there is strong evidence it was first cultivated in Mesoamerica more than 3000 years ago, and no evidence for any precontact cultivation of CACAOs *for seeds* anywhere in South America. Some botanists believe the species *T. cacao* originated only 10–15,000 years ago, as a cross between a brace of *Theobromæ*. Long-distance maritime trade-routes had connected Mesoamerica with coastal South America by the advent of the first millennium B.C., and CACAO was apparently brought there, along with other important South American shamanic plants like *Brugmansia*, while even COCA was a precontact cultivar at least as far north as Nicaragua; as *hayo* or *güeyo* was common on Cuba and Hispaniola, and as of 1801 was still used in Mesoamerica, possibly even cultivated as far north as Chiapas [Las Casas 1909; Monardes 1990; Navarro 1992; Pané 1974]. By 1000 B.C., CACAO was the primary crop of SE Mesoamerica; by 400 B.C. central to the economy of the region [Smith *et al.* 1992; Young 1994]. I wish to note some South American linguistic crossovers involving CACAOs. *Pace* many books, CACAO appears not to be of Mayan/Mesoamerican derivation, inasmuch as the root is found in Tupí-Guaraní languages for *T. cacao* and *T. speciosum*, along with roots for other CACAO-terms (*e.g. cupuí* for *T. subincanum*; *cupuassú* [or *cupuaçú*] for *T. grandiflorum*) [Balée 1994]. The Mesoamerican name for *T. bicolor*, *pataxte* (*pataste*; Náhuatl *cacahoapatlachtli*) exists through Central America to Ecuador—as *patasi* in the Río Napo; although in this latter case it is less clear in which direction this phoneme migrated. Inasmuch as *T. cacao* is of South American origin and immemorial association with humankind there, logic dictates the Mesoamericans derived their words (*cacáhuatl* in Náhuatl) from Tupí-Guaraní, not conversely. We've seen intimate relationships between CACAOs as snuff, TOBACCO and COCA ash-sources and that both *Virola* and *Eschweilera* (another important ash-source) species are called CACAOs. Significantly, two species

of Malpighiaceæ, *Heteropterys longifolia* and *H. platyptera* var. *martinicensis*, are called *liane cacao* (CACAO-liana) in the Caribbean [von Reis Altschul 1973]. Two *Banisteriopsis* species are named *huillca bejuco* («*vilca*-liana»), while a Colombian *Piptadenia* is known as *chocolatillo* («little chocolate») [Duke 1981]; and theobromine occurs in *P. leptostachya* BENTH. [Yamasato 1972]! *Quararibea cacao* (TRIA. & PLAN.) BAIL. and *Q. cordata* (H. & B.) VISCH. (Bombacaceæ) bear names relating to CACAO in Colombia and Brasil: *cacao simarrón* («wild») and *cupuassú*—significant, since *Q. funebris* (LA LLAVE) VISCHER is *cacahuaxóchitl* (or «cacao-flower») in Mesoamerica, its aromatic flowers still used as additives to *chocolate* in Oaxaca [Rutter 1990; Schultes 1957]. I've noted importance of *lupuna*-Bombacaceæ both as TOBACCO- and AYAHUASCA-plants in Amazônia—in Mesoamerica, *Q. funebris* flowers seasoned both *acáyetl* TOBACCO-reeds for smoking, and orally-ingested CACAO-potations [Sahagún 1950–1969], and the Central American species, *Q. fieldii* MILLS., *madre de cacao*—known as *maha* in Mayan—is also still used as a spice in *chocolate*. Furthermore, *lupuna blanca*, *Ceiba pentandra* (*póchotl* in Náhuatl), was likewise added to *cacáhuatl* in Mesoamerica (as perchance to AYAHUASCA in Perú), into a potion called *chocóllatl*, whence some think derived our word *chocolate* [Hernández 1942]. An obscure Shipibo-additive to *nishi oni* (or AYAHUASCA) in Perú, *ishpingo* or *ispincu* (*espingo*), is probably seeds of a species of *Quararibea*, used like *vilca*-seeds as Peruvian additives to *chichas* called *yale* [Wassén 1979] (whence *yajé*?); *Q. putumayensis* CUATR. is a Kofán *curare*-plant; fruits of bombacaceous *Patinoa ichthyotoxica* SCHULT. & CUATR. are a Tukuna fish-poison, commonly called *cupuassú-rana*, «false *cupuassú*» [Schultes & Raffauf 1990]. I've noted that in Mesoamerica, *cacáhuatl* or CACAO-potions constituted a sort of «*ayahuasca*-analogue»—like AYAHUASCA, *cacáhuatl* was an all-purpose pharmaceutical vehicle for administration of many medicinal plants; both curative specifics and shamanic inebriants. Besides seeds of *póchotl*, *Ceiba pentandra*, flowers of the related *Q. funebris* and seeds of *Virola guatemalensis*, Mesoamerican CACAO-brews at times contained psilocybian mushrooms (*teonanácatl*), flowers of *Solandra* (Solanaceæ; *tecomaxóchitl*) or *Datura* species (as *mixitl*), *Tagetes* flowers (*yauhtli* and *zempoalxóchitl*) and *Piper* leaves (*mecaxóchitl*)—all entheogens—as well as some probable entheogens including flowers of a *Calliandra* species called *xiloxóchitl* (as *per* Shuar-*natem*[a]), *Cymbopetalum penduliflorum* (DUN.) BAILL. (Annonaceæ; *teonacaztli* or «sacred ear») and *Magnolia dealbata* ZUCC. (Magnoliaceæ; *eloxóchitl*, «maize-flower»; *elexóchitl*, mayhap «ardent desire-flower») [Ott 1985; Sahagún 1950–1969]. The epigram introducing this chapter indicates many such «flowers» (since in Náhuatl, *xóchitl* or «flower» was a poetic metaphor for «entheogen») were also additives to *acáyetl* TOBACCO-reeds: *Quararibea*, *Piper*, *Cymbopetalum*, *Tagetes* and some species of visionary mushrooms. But Mesoamericans had still another class of «*ayahuasca*-analogues», alcoholic *chichas* known as *balché* in Mayan and *octli* in Náhuatl (*pulque*). In both cases many visionary admixtures were involved, but it is significant that the primary and definitive additive to each was leguminous. The Mayan metheglin (medicated mead) is named for the *balché*-tree—*Lonchocarpus violaceus* (JACQ.) DC.—whose bark was fermented with water and stingless-bee honey. By the same token, Mesoamericans fermented *octli* from sweet saps (*hidromiel*) of *Agave* (Amaryllidaceæ; *metl* in Náhuatl), with *ocpatli* roots, «*octli*-drug», from leguminous tree *Acacia angustissima* (MIL.) KUNTZ. (and the roots of *Calliandra anomala* (KUNTH.) MACBR.)—still called *palo de pulque*, «*pulque*-tree» or *ñupi-* (*pulque-*: *ñopo*?) tree in Zapotec, first Mesoamerican entheogen to be proscribed by the Spaniards, by royal decree in 1529, 42 years before the «Holy Office of the Inquisition» was constituted in New Spain, and 91 years before the more famous *péyotl* and kindred entheogens were decreed heretical. *Balché* in the Mayan area, and *octli*/*ocpatli* in highland Mesoamerica, were clearly the most common, everyday, working-class entheogens at the time of contact. We've found that in South America species of *Acacia* were involved in the *jurema*-complex, while species of *Lonchocarpus* may be fish-poisons and *curare*-additives [Rätsch 1998a; Schultes & Raffauf 1990; Uphof 1968]. Not only did CACAO and allied shamanic plants spread by trade to Mesoamerica in precontact times, but we descry strong parallels between Mesoamerican and South American ethnopharmacognosy. In both cases, Leguminosæ and Sterculiaceæ are central elements, TOBACCO is intimately intercalated, and the Bombacaceæ, especially *Quararibea* species, are inextricably related to CACAOs. *Virola* is an additive both to AYAHUASCA and CACAO-potions, besides being itself a major snuff-plant, and we see common additives in other families, including Boraginaceæ, Compositæ, Piperaceæ and Solanaceæ. Andean *San Pedro*-cactus has its pharmacognostical equivalent in the Mesoamerican *péyotl*-cactus, both inseparably interrelated with TOBACCO like AYAHUASCA and *cacáhuatl*-potions, the last taken during feasts, accompanied by smoking *acáyetl* TOBACCO-reeds; potions and reeds containing many of the same entheogenic admixtures, mostly having direct parallels in South American snuff-, *ipadú* COCA- and TOBACCO-additives; in each of which CACAOs are key. Not only are we faced with a pan-South American complex of shamanic inebriation, but this includes also Mesoamerica in its prodigious pharmacognostical purview, with roots dating back at least three millennia. Moreover, this shamanic pharmacognosy extends northward—*via* TOBACCO, *péyotl*, *Datura*—far into North America, where earliest human uses of the first two likely took place; whereas *Amanita muscaria*, primal entheogen of Beringian groups who first migrated into Neogæa decades of millennia ago, plaits and interweaves the whole with far more archaic roots in Siberia.



Pagamea macrophylla SPRUCE ex BENTHAM [Rubiaceæ], M.L. Estey, the leaves of which constitute *na-nu-su-ka-ta*, divinatory snuff of Barasana shamans of the Colombian Río Piraparaná.

CHAPTER FOUR

Lesser-Known Snuff-Sources

> Accidentally, we had good proof of the toxic effect of *koribó*. We collected a large amount of the vine for chemical study and kept it in the room where we were staying. The doctor of our expedition… sat beside the heap of *koribó*. Several Indians commented on the smell of *koribó* in the room, mentioned its toxic effect and left the room. After half an hour, Dr. Ferraroni… was so dizzy that he had to crawl out on all fours.
>
> **Ghillean T. Prance**
> *Ethnobotany of the Paumarí Indians* [1977]

ACORUS CALAMUS L.–The rhizome of this araceous North American stimulant and putative visionary drug [Ott 1996], was pulverized and snuffed by the Chippewa Indians as a cold-remedy [Densmore 1974], and a similar use was reported for the Potowatomi Indians [Motley 1994]. The Chippewa were said also to mix the powdered rhizomes with the roots of *Asarum canadense* L. [Morgan 1980], and pounded, dried leaves of this plant were also employed as a snuff by the Cherokee Indians [Moerman 1998], reflecting a 19TH-century report of the use of *Asarum europæum* L. as a stimulating snuff in Europe [Cooke 1860]. Like the *calamus*-rhizomes, roots of *A. europæum* contain asarone, once thought to be the stimulating principle of the former, although this appears to be a constituent only of Palæogæan strains, *calamus* being a *sedative* in Asian ethnomedicines. It is now believed that *Acorus calamus* is a postcontact introduction into North America, and that the indigenous *muskrat-root* represents a distinct species, *A. americanus* (RAF.) RAF. [Ott 1996], the stimulating and possibly psychoptic principle of which remains to be identified. Palæogæan *calamus* is still used as a tobacco-snuff flavoring in Europe [Motley 1994; Uphof 1968].

ARCTOSTAPHYLOS UVA-URSI (L.) SPRENG.–This ericaceous herb, commonly known as *bearberry* or *kinnikinnick*, was widely smoked as an inebriant by North American Indians. At least the Northwest Coast Hesquiat Indians prepared the powdered leaves of this plant as a snuff with tobacco [Moerman 1998]. Powdered «rusty» leaves of ericaceous *Rhododendron campanulatum* D. DON were reportedly used as a snuff in India [Cooke 1860], and still are used there for medicinal purposes, mixed with tobacco-snuff [Nadkarni 1976]. Powdered leaves of the related *Kalmia angustifolia* L. were likewise used as a medicinal snuff by the Canadian Abnaki Indians [Moerman 1998], and both *Kalmia* and *Rhododendron* snuffs were said to have been used

as tobacco-substitutes in North America [Cooke 1860]. The inebriating principle of *A. uva-ursi* remains obscure, but *Rhododendron* and *Kalmia* species, like allied ericaceous shamanic inebriants *Ledum palustre* L. and *L. grœnlandicum* OEDER, owe their psychoactivity to glucosides such as the grayanotoxins and ericolin [Ott 1996].

ARTEMISIA SPECIES–Leaves of numerous North American species of *Artemisia* were used as snuffs (in some cases dried leaf-powders; in others crushed, fresh leaves were put in the nostrils), primarily as an analgesic against headache or as a cold-remedy: *A. douglasiana* BESS. (Miwok of California); *A. furcata* var. *heterophylla* (BESS.) HULTÉN (Mendocino of California); *A. ludoviciana* NUTT. (Cheyenne); *A. tridentata* NUTT. (Thompson of Northwest) and *A. vulgaris* L. (Miwok) [Moerman 1998]. The Lahu of Thailand make similar use of snuffed leaves of *A. dubia* WALL. ex BESS. [Anderson 1986]. Moreover, bruised leaves of *A. tridentata* were also used as a stimulating snuff by the Thompson Indians; and *A. californica* LESS. (Cahuilla of California) and *A. ludoviciana* (Sioux) were sometimes smoked with tobacco, while the Kashaya Pomo of California smoked *A. douglasiana* leaves as a tobacco-substitute [Moerman 1998]. Lodha of W. Bengal, India, similarly smoke leaves of *A. nilagirica* (CLARKE) PAMP. «for hallucination» [Pal & Jain 1989], while *itzauhyatl* or *A. mexicana* WILLD. was an important inebriant in precontact Mesoamerica [de la Garza 1990], and current use of infusions of leaves and stems of *A. copa* in Chile was said to be «probably hallucinogenic» [Aldunate *et al.* 1983]. It is uncertain whether use of *A. afra* JACQ. as a snuff in Africa—and other Compositæ: *Aster bakeranus* DAVY ex SM., *Conyza scabrida* DC., *Cotula anthemoides* L., *Euryops evansii* SCHLTR. [de Smet 1998; Hutchings & von Staden 1994]—be fundamentally curative or ebrious; as likewise snuffing for headaches by Shuars of *Eupatorium macrophyllum* L. leaf [Russo 1992]. Many of these species are known to contain the psychoactive terpenoid thujone, best-known from *absinthe* liqueur-source *Artemisia absinthium* L. [Conrad III 1988].

BANISTERIOPSIS CAAPI (SPR. EX GRISEB.) MORT.–Famous as base-plant for preparation of Amazonian *ayahuasca*-brews [Ott 1999B], *Banisteriopsis* lianas also enter into the preparation of Amazonian shamanic snuffs, and at times are chewed as an adjunct to their ingestion. We have seen that harmine and *d*-leptaflorine, as likewise traces of harmaline—which are «signature» alkaloids for *Banisteriopsis* in South American ethnopharmacognosy—have twice been found in Venezuelan Surára Indian *epéna*-snuff [Bernauer 1964; Holmstedt & Lindgren 1967], as well as in a piece of liana-stem said to have been used in preparation of *paricá*-snuff by Tukano and Tarianá Indians of the Río Negro [Biocca *et al.* 1964], and more recently in Piaroa Indian-snuff from

Venezuela [de Smet & Rivier 1985]. Reichel-Dolmatoff [1996A] reported Tukano tobacco-snuff *cum Banisteriopsis* bark. Spruce [1908] had described itinerant Guahibo Indians near the Maipures Falls of the Orinoco River-basin of Venezuela, chewing dried *Banisteriopsis caapi* lianas «as some people do tobacco», being adjunct to the taking of *ñopo* or *Anadenanthera* snuff, and recently an anthropologist studying the Piaroa Indians of the Venezuelan Orinoco was given to chew a piece of a liana called *capí* (surely *B. caapi*), prior to sampling the Piaroa *yúwa*-snuff [Castillo 1997]. The neighboring Pumé Indians likewise chew cultivated roots and stems of *tuipa* (*B. caapi*) «without preparation to induce hallucinations. It is typically used in conjunction with snuff made from the seeds of *Anadenanthera peregrina*» [Gragson 1997]. Davis and Yost [1983] noted that Ecuadorian Waorani will blow tiny pieces of *B. muricata* lianas into the *lungs* of boys, in order that they may grow-up to be great hunters.

CANNABIS SPECIES–Primarily used in fumatories and for potions (*bhang*), *Cannabis* also enters into inebriating snuffs. The Zulus of South Africa were said to have made a snuff from dried leaves of *dagga* (or «narcotic hemp») and the ashes of *Aloe* species [Cooke 1860; de Smet 1998; Watt & Breyer-Brandwijk 1962]. De Smet [1985A,1985B] has speculated whether *Cannabis* might have been the «African tobacco»—*pango*—said to have served as substitute for genuine *paricá*-snuff in the «*paricá*-tobacco» of 19TH-century Brasil. Dried *Cannabis* flowers and leaves are the principal ingredients for *thapana*, a snuff used in Nepali Kirati-shamanism [Müller-Ebeling *et al.* 2000].

CAPSICUM SPECIES–De Smet [1985A,1985B] has reviewed evidence for use of *Capsicum* species (*chile* or *ají*) as snuff-plants in South America—Cocama Indians snuff tobacco-juice with *chile* [Métraux 1948]. Recent reports of African initiatory snuffs used by the Kuasi-people of Ghana, likewise refer to «red pepper» as an ingredient (*vide infra*: *Ipomœa*, *Piper*, *Securidaca*, *Tinospora*) [de Smet 1998; Neuwinger 1996].

DATURA SPECIES–There is an unreliable report that dried *Datura* or *toloache* (= *toloatzin*) leaves were taken as snuff in Guanajuato, México [Reko 1936], while powdered *Datura* leaves are snuffed with tobacco in Zimbabwe [de Smet 1998]. *Datura* seeds combine with *Cannabis* in *thapana*, a Nepali Kirati shamanic snuff [Müller-Ebeling *et al.* 2000]. In South Africa, the dried and pulverized leaves of *Solanum mauritianum* SCOP. are snuffed by Xhosas as a headache-remedy [Hutchings & von Staden 1994].

DIMORPHANDRA PARVIFLORA BENTH.–Richard Spruce collected a specimen of *D. parviflora* in April 1851 at Barra, Brasil, and noted on his herbarium-sheet: «from the

seeds of this a noted snuff is made. *Paricá* Ling. Ger.», using one generic name for shamanic snuffs, applied alike to *Anadenanthera* and *Virola* powders, which must be considered to refer to inebriating snuffs in general—like the former, *Dimorphandra* is also a species of Leguminosæ. The related species *D. mollis* BENTH. is reported to contain alkaloids, but this genus is chemically recondite [de Smet & Lipp 1987]. Roots of the South African legumes *Rhynchosia caribæa* (JACQ.) DC., *R. harveyi* ECKL. & ZEYH. and *Tephrosia capensis* (JACQ.) PERS. are snuffed to treat headaches [Hutchings & von Staden 1994]. The Amazonian Makuna snuff leaves of *Inga lallensis* SPR. ex BENTH. with tobacco [Schultes & Raffauf 1990], and bark of the leguminous *kasawari* is also snuffed as headache-remedy by the Paumarí Indians [Prance *et al.* 1977].

ERYTHROXYLUM COCA LAM. VAR. IPADU PLOW.–Much better known as a stimulating masticatory, nonetheless alternate uses of *ipadú* or Amazonian *coca* [Plowman 1981] have been reported. The Makú Indians of the upper Rio Uneiuxi of Amazonian Brasil ingest *ipadú* as a victual, first pulverized and mixed with ash of banana-leaves, and combined with cassava-flour for ingestion, a food called *botô* [Prance 1972]. As in the Andes, *mate* or infusion of *coca* may be taken in the Amazon, as reported by Koch-Grünberg among the Tukanoan Indians, and Schultes cited «vague reports» to the effect that *ipadú* is taken as snuff by the Yukuna and Tanimuka Indians of the Río Miriti-Paraná [Schultes 1981], having earlier reported that the former and the Witoto of the Río Igaraparaná made a snuff of *ipadú* with tobacco [Schultes 1967]. In this prior report he implied he had actually *witnessed* such, while in a later paper referred to «unconfirmed rumours» of *coca*-snuffing, noting: «I have never witnessed this custom» [Schultes 1984]. Here he clarified that his prior report came from one Capuchin Padre Javier who: «used coca himself and would hardly have confused coca powder with tobacco snuff». Timothy Plowman [1981] doubted another report from 1937 of Witoto use of a *coca*-snuff, but Reichel-Dolmatoff [1996A] subsequently noted the Colombian Tukano at times snuff tobacco with *ipadú coca* or *ayahuasca*.

FOMES FOMENTARIUS (FR.) GILL. **AND OTHER POLYPORACEÆ**–We have reports from Kamchatka, Siberia, of the use of a species of Polyporaceæ—or its ashes—as a snuff, probably *Fomes fomentarius* or *Polyporus sulphureus* (BULL.) FR. [Uphof 1968; Wasson 1968]; and there was recently a clinical case of «visual hallucinations and ataxia» in a child who had consumed *P. sulphureus* [Appleton 1988]. As *snoosa*, both *F. fomentarius* and *F. igniarius* (L.) GILL. are reportedly snuffed and smoked, in combination with tobacco, on Little Diomede Island of Alaska, in the Straits of Bering [Ott 1978]. This apparently points to the survival of a pan-Siberian practice which must predate

the introduction of tobacco (*circa* 1580, *per* Yermak), as it has been reported that *F. fomentarius*, *Inonotus obliquus* (FR.) PILÁT and *Phellinus nigricans* (FR.) KARST., are still used as «smokes» or incenses associated with funereal rites (the ash of the last as an additive to chewing-tobaccos) among the Khanty or Ostyaks of the Ob River Valley in western Siberia [Saar 1991]. Powdered *Amanita pantherina* (DC. ex FR.) SECR. and *Psilocybe* species are minor ingredients (*ca.* 2%) of the Nepali Kirati shamanic snuff *thapana* [Müller-Ebeling *et al.* 2000]. The Ojibways or Ahnishinaubeg of the Great Lakes-region mixed powdered *F. fomentarius* with tobacco, so «to enhance ignition... the narcotic properties were enhanced by this admixture» [Keewaydinoquay 1998]. «Ghost bread», *Fomitopsis officinalis* (VILL. ex FR.) BOND. & SING., is used as a «trance-inducing snuff» by northwestern North American shamans, and carved specimens were prominent as «guardians» for sepulchers of shamans of the Haida [Blanchette *et al.* 1992; Rätsch 1998A]. Canadian Thompson Indians drink decoctions of a willow-polypore as a «tonic»; also «taken as [a] purgative by hunters to increase endurance» [Turner *et al.* 1990]. In Amazonian Ecuador, a *Ganoderma* species is pulverized and smoked with tobacco, reportedly provoking *ayahuasca*-like effects [Rätsch 1998A], while an inscribed fruiting-body of *G. lobatum* (SCHW.) ATK. enjoys iconic status in a church of Chignahuapan, México, *Nuestro Señor del Honguito*—«Our Lord of the Little Mushroom» [Guzmán *et al.* 1975]. Of course, *G. lucidum* (FR.) KARST. is *ling chih* («divine mushroom of immortality») to Chinese Taoists [Wasson 1968]. Hispidin, a styrylpyrone akin to the psychoactive *kava*-pyrones (from *Piper methysticum* FORST. F.—*vide infra, Piper*) is known from *Polyporus hispidus* (BULL.) FR. as well as *P. schweinitzii* FR. [Edwards *et al.* 1961; Ueno *et al.* 1964]; and *péyotl*-alkaloids hordenine and tyramine from various polypores, including *P. sulphureus* [Lee *et al.* 1975].

ILEX GUAYUSA LOESN.–The high caffeine-content of *Ilex guayusa* leaves (Aquifoliaceæ), like *hierba mate* or *I. paraguariensis* leaves, accounts for their use in infusions and as *ayahuasca*-additive [Ott 1999B]. We've no ethnographic evidence for historical use of *guayusa* as a snuff, but the discovery of a 1500-year-old shaman's tomb in Bolivia suggests such use in the remote past. Well-preserved bundles of *guayusa*-leaves, in which caffeine could still be detected, were found along with a mortar and pestle and containers for the resulting *guayusa* snuff-powder [Schultes 1984; Wassén 1972]. Nicotine has also been detected in leaf-fragments of *Nicotiana glauca* (tree-tobacco) recovered from the same sepulcher [Bruhn *et al.* 1976; Holmstedt & Lindgren 1972].

IPOMŒA SPECIES–Two different recipes for a Kuasi initiatory snuff from northern Ghana both refer to the use of *datin vulin*, the roots of *Ipomœa digitata* L., either *en*

lieu of or perhaps in addition to, roots of *ba-illa* or *puung-buur*, *Tinospora bakis* (*vide infra*). This snuff is used to «narcotize» initiates, and also contains *Securidaca longipedunculata*, red pepper, *Piper guineense* and *Zanthoxylum zanthoxyloides* [de Smet 1998; Neuwinger 1996]. There is also a report of a Sotho-snuff from South Africa, in which leaves of *I. oblongata* are mixed with tobacco [de Smet 1998; Watt & Breyer-Brandwijk 1962]. We have no chemical *data* on either of these convolvulaceous species, which are, of course, taxonomically related to the well-known shamanic inebriants *I. violacea* L. (*tliltliltzin*) and *Turbina corymbosa* (L.) RAF. (*ololiuhqui/xtabentún*) from Mesoamerica, along with *I. carnea* JACQ. (*borrachero*) from Ecuador, the seeds of all three of which produce various psychotropic ergoline alkaloids [Ott 1996].

JUSTICIA PECTORALIS JACQ. VAR. **STENOPHYLLA** LEON.–As I have commented, the aromatic leaves of this acanthaceous plant are common additives to visionary *epéna*-snuffs of the Waiká Indians of Brasil and Venezuela, who generally know the plant as *masha-hiri* or *mashi-hiri*, and also as *henakö* [Brewer-Carias & Steyermark 1976; Chagnon *et al.* 1971; Prance 1972; Schultes 1990; Seitz 1969]. Schultes suggested that earlier reports of snuff-additives *kokóime* and *maxarahá* likewise refer to *J. pectoralis*, as also do the variant names *masho-hara*, *masci-hiri* and *machohara*. Although some users describe this as purely an aromatic additive, others insist it is also psychoactive, and there are at least two reports of *epéna*-snuffs being made exclusively of *masha-hiri* [Chagnon *et al.* 1971; Schultes 1990]. Moreover, low levels of psychoptic tryptamines have twice been detected in *J. pectoralis* [Schultes 1990; Schultes & Holmstedt 1968]. However, subsequent studies have failed to confirm tryptamines in this snuff-plant [McKenna *et al.* 1984A; MacRae 1984; MacRae & Towers 1984B]; although coumarins and traces of uterotonic quinazoline alkaloid vasicine were found [Schultes 1990], plus visionary tryptamines in Waiká *mashahari*-snuff [McKenna *et al.* 1984B]. Acanthaceous *Sanchezia* sp. leaves are allegedly «smoked or made into a tea for hallucinogenic effect» near Yarinacocha, Perú [Maxwell 1990; Schultes & Raffauf 1990]

MAQUIRA SCLEROPHYLLA (DUCKE) BERG.–Although now apparently obsolete, there is strong evidence that the dried fruits of this Amazonian tree, previously characterized as *Olmedioperebea sclerophylla* DUCKE, were the source of the visionary snuff *rapé dos índios* («Indian-snuff») in the Pariana-area of southern Brasilian Amazônia [Schultes 1967,1984]. We have no relevant chemical *data* on these fruits, but aqueous and ethanolic extracts of the *wood* of *M. calophylla* (POEPP. & ENDL.) BERG. were devoid of *Cannabis*-like activity in animal-assays [Schultes & Farnsworth 1980]. This species was later shown to contain a cardiac glycoside named maquiroside A, as well as

the related compound cymarin [Rovinski *et al.* 1987]. Subsequent research was conducted in Brasil with a supposititious «Indian-snuff» from *M. sclerophylla*, in reality laboratory-ground *bark* harvested from trees at the «Ducke Reserve» in Manaus, where: «local information... indicated that the dried and powdered bark of the trunk is probably the main source of the snuff». However, the scanty ethnographic *data* regarding *rapé dos índios* places such use «especially along the upper Xingú», in Pará, which is to say roughly 1000 km southeast of Manaus! It is a mystery to me how «local information» in Manaus is germane to the problem of a recondite and distant shamanic inebriant, and these pharmacologists in São Paulo provided no other justification for concentrating on the *bark* and not the dried *fruits* of *M. sclerophylla*. Perhaps their statement: «the occasional seeds are not easily obtained» cuts closer to the bone of contention—in no sense can their ground bark be considered «Indian-snuff». Nonetheless, both crude and fractionated aqueous extracts of the bark provoked amphetamine-like stimulation following intraperitoneal injection into rats, which was not elicited after oral administration. Lower doses injected intravenously produced dramatic cardiotoxicity—only 4% of the stimulant-dose, i.v. in dogs, caused death from cardiac arrest! Obviously more interested in novel pharmaceuticals than visionary drugs («need for new cardioactive glycosides... is a good reason to pursue further pharmacological research on this unique indian snuff»), this became the focus of the researchers, who again isolated those two *Digitalis*-like cardiac glycosides, cymarin and maquiroside A [de Carvalho & Lapa 1990; de Carvalho *et al.* 1997]. In a tangential study of moraceous dart-poison plants, including *Maquira* and *Nauceleopsis* species, these compounds were also isolated from seeds of *M. sclerophylla*, as well as from bark of *M. guianensis* AUBL. and seeds of *M. coriacea* (KARST.) BERG [Shrestha *et al.* 1992]. Having failed to pursue their intriguing initial finding of amphetamine-like stimulation following intraperitoneal injection into rats of an aqueous extract of *M. sclerophylla* bark, not to slight *eschewing the essential human psychonautic bioassay*, and failing to conduct the most minimal field-studies of *rapé dos índios*, the Brasilian pharmacologists went on to cobble-together a specious rationale for their cardiac glycosides as psychoactive agents («one might think of cardenolides as hallucinogenic drugs»)! Far be it from them to sacrifice their «scientific objectivity» by deigning to sample their supposititious «Indian-snuff», much less to put to the test their notion that maquiroside A and/or cymarin constitute its «hallucinogenic drugs»! O, no, theirs but to deal death to legions of helpless dogs and guinea-pigs—they noted cavalierly that «in guinea-pigs and dogs death was frequent». Rather than conduct *real* research on *rapé dos índios*, perhaps have to «rough it» in the back country, far better to pursue the pot of gold at the end of the rainbow,

then to speculate with a taint of condescension (if not racism): «it would not be unusual if the Indians tried to sniff the dark poison prepared from plants containing cardenolides»! Here's a textbook-example of *how* not *to conduct ethnopharmacognostical research*, and the question of the entheobotany of *rapé dos índios* remains unanswered, as they in the end acknowledged: «The different effect produced by cardenolides isolated from Maquira on nerve terminals may support the putative use of this snuff as hallucinogenic in Indian festivities. Nevertheless, more specific and direct tests are necessary to confirm this possibility»—try field-work and psychonautic bioassays!

PAGAMEA MACROPHYLLA SPR. EX BENTH.–The Makuna and Barasana Indians of the Colombian Río Piraparaná elaborate a divinatory snuff called *ma-na-shu-ke-ma* or *na-nu-su-ka-ta*, from the pulverized leaves of a small rubiaceous tree, *Pagamea macrophylla*. Leaf-infusions are also used as a gastric remedy, and the Kubeo Indians of Colombia use bark and fruits of the related *P. coriacea* SPR. EX BENTH. in ethnomedicine [Schultes 1980B]. We've no solid chemical *data* on *P. macrophylla*, which is in the family of *ayahuasca*-admixture *chacruna*, *Psychotria viridis* RUIZ & PAV., a source of DMT for the visionary potions [Ott 1999B]. Leaves of *Cephælis williamsii* are sometimes smoked with tobacco in the Colombian Putumayo [Schultes & Raffauf 1990].

PIPER SPECIES–In northern Ghana, the Kuasis compound a «narcotizing» snuff for initiations from seeds and root-bark of *zurmuri*, *Piper guineense* SCHUM. & THONN., with roots of *Ipomœa digitata*, *Securidaca longipedunculata* and *Tinospora bakis*, as well as red «pepper», root-bark of *Zanthoxylum zanthoxyloides* and the head of a bat [de Smet 1998; Neuwinger 1996]. The Kulina Indians of Amazonian Perú prepare as «tobacco-substitute» a snuff from dried leaves and roots of *tetsi*, *Piper interitum* TREAL. EX MACBR. [Schultes 1980A], and *holehole be*, *P. cryptodon* DC., is also used as tobacco-substitute by Yanoáma Indians [Wilbert 1987], while an unidentified *Piper* species is employed as admixture to *ayahuasca*-potions [Ott 1999B]. The genus *Piper* is famous for the pyrone-rich *P. methysticum* or *ava/kava*, source of inebriating *kava*-beverages, as well as *P. betle* L., or the *betle*-leaf, wrapped around quids of stimulating *betel*-nuts, *Areca catechu* L.—many *Pipers* contain the volatile oil safrole [Ott 1996].

SECURIDACA LONGIPEDUNCULATA FRESEN.–Roots of this important African arrow-poison and ordeal-poison plant are the base, as *pelig*, for the initiatory snuff of the Kuasi-diviners of Ghana, in combination with the roots of *Ipomœa digitata* and *Tinospora bakis*, the root-barks of *Piper guineense* and *Zanthoxylum zanthoxyloides*, red «pepper» and a dried head of a bat [de Smet 1998; Neuwinger 1996]. In Guinea Bissau, aqueous extracts of the roots of this plant, *tchúnfki*, are employed by the Balanta as a ritual inebriant [Costa *et al.* 1992], whereas in Malawi, roots, *bwazi*, are snuffed to induce *madzoka* or «spirit-possession», combined with roots of *Annona senegalensis* and the leaves both of *Asparagus africanus* and of *Chenopodium ambrosioides* (*vide infra*) [de Smet 1998; Hargreaves 1986; Samorini 1996]. *Bwazi/pelig/tchúnfki* is a veritable pharmacopœia of toxic compounds, and the roots of *S. longipedunculata* were shown to contain the apparently-psychoactive ergoline alkaloid elymoclavine—already known from seeds of the Mesoamerican shamanic inebriants *tliltliltzin* (*Ipomœa violacea*) and *ololiuhqui/xtabentún* (*Turbina corymbosa*; both Convolvulaceæ)—plus dehydroelymoclavine and an unidentified ergoline alkaloid [Costa *et al.* 1992].

TANÆCIUM NOCTURNUM (BARB.-RODR.) BUR. & SCHUM.–The leaves of this bignoniaceous liana, *koribó*, are used by the Paumarí Indians of the Río Purús in Amazonian Brasil to prepare an inebriating snuff. They are finely powdered and mixed with similarly-prepared tobacco to yield the snuff, *koribó-nafuni*, employed in festivals and as a divinatory inebriant by shamans. Root-bark is also used by women in a sedative infusion [Prance 1978; Prance *et al.* 1977]. As the epigram at the beginning of this chapter manifests, mere inhation of the *effluvium* of the fresh plant is sufficient to overcome one, an effect thought to be due to: «an extremely high concentration of hydrogen cyanide in the fresh leaves», which probably can account for their pungency and almond-like aroma. Since the leaves are roasted until dry to prepare the fine *koribó-nafuni*-powder, this would be expected to drive-off all of the HYDROGEN CYANIDE (HCN), which could not then account for the psychoactivity of *koribó*. Leaf-infusions of *Tanæcium nocturnum*, with leaves of an unidentified leguminous plant, are used by the Karitianá Indians of the Rio Madeira to treat diarrhœa, and Indians of the Colombian Chocó regard it to have aphrodisiacal properties [Schultes 1984]. Prance's group [1977] also reported the snuffing of both bark and leaves of obscure bignoniaceous *mãnaka* by the Paumarí Indians, in the treatment of colds and fevers.

TINOSPORA BAKIS (RICH.) MIERS.–The roots of the menispermaceous *Tinospora bakis*, as *ba-illa* or *puung-buur*, are a component of the inebriating Kuasi-snuff from Ghana, which contains also roots of *Ipomœa digitata* and *Securidaca longipedunculata*, with root-barks of *Piper guineense* and *Zanthoxylum zanthoxyloides*, as well as red «pepper» and dried bat-head [de Smet 1998; Neuwinger 1996]. *Tinospora* species are important tonics in Indian medicine [Nadkarni 1976], but no psychoactive compounds are known from the genus, nor indeed the family Menispermaceæ, although we have seen that an *Abuta* species is implicated in *paricá*-snuff [*vide* CHAPTER ONE].

TRICHOCEREUS PACHANOI BRITT. & ROSE–Although ordinarily taken orally—and neat—infusions of this mescaline-rich *San Pedro*-cactus (*vide* CHAPTER ONE), plus «wild tobacco juice» are taken intranasally during Peruvian *mestizo* healing-sessions [Sharon 1979]. Furst [1974] has summarized the archæological evidence for snuffing in Mesoamerica, which involved «snuff-pipes» for rhinal administration of liquids. One snuff-pipe shows a deer with *péyotl*-cacti (*Lophophora williamsii*) in its mouth, suggesting mescalinic cactus-infusions had likewise been snuffed in Mesoamerica.

TRICHOCLINE SPECIES–Five species of *Trichocline*—*T. auriculata* (WEDD.) HIER., *T. dealbata* (HOOK. & ARN.) GRISEB., *T. exscapa* GRISEB., *T. incana* GRISEB. and *T. reptans* (WEDD.) ROB.—are called *coro* in the Chaco of northern Argentina, and have long been used as inebriants, especially the last and most common species. Jesuit Padre Lozano described *coro*-root as an inebriating additive to alcoholic *chicha* by the Calchaquí Indians, and such use was reported as far south as Buenos Aires Province, where the Mapuche and Pampa Indians also made a beverage with *coro*, *kóre-koré*. Today *coro* may still be used, albeit now it is commonly smoked with tobacco (with which it is confused), by the Wichi, Toba and the Mocoví Indians [Pérez Gollán & Gordillo 1994; Zardini 1977]. Wichi-shamans still use *cebíl* or *Anadenanthera* snuff, which they call *hatáj*, although they generally smoke this, also with tobacco [Rätsch 1996A; Torres & Repke 1996]. In antiquity, *coro*-root was also used as a snuff, as reported by Bernabé Cobo in the Province of La Paz, Bolivia [Cobo 1956; Uhle 1898]; however this practice seems to have died-out. In the colonial *Relaciones geográficas de Índias, Perú*, we find: «There is tobacco [-use] also among the Indians, which they call *sayre*... and of the root that they call *coro*, and they purge with this and they take it in powders». We have no chemical nor contemporary ethnographic *data* on *coro*, although several other Compositæ species are used as visionary drugs, such as Mesoamerican *yauhtli*, *Tagetes lucida* CAV. / *T. erecta* L.—both, alas, recondite (*vide infra*).

ZANTHOXYLUM ZANTHOXYLOIDES (LAM.) WATERM.–The root-bark of this rutaceous plant, *bebung*, enters into the composition of the inebriating Kuasi-snuff from Ghana, along with root-bark or seeds of *Piper guineense*, red «pepper», bat's head and the roots of *Ipomœa digitata*, *Securidaca longipedunculata* and *Tinospora bakis* [de Smet 1998; Neuwinger 1996]. In Guinea and Nigeria, *Z. zanthoxyloides* is said to be «narcotic» [Watt 1967], as is also *Z. martinicense* (LAM.) DC. of the Caribbean, which is an ingredient in the Haitian *zombi*-powder [Davis 1988]. The leaves of *Z. arborescens* ROSE and *Z. procerum* DONN. SM. contain the entheogenic DMT, a trace-tryptamine found in some South American visionary snuffs [Grina *et al.* 1982; Schroeder 1986].

MUCOUS MISCELLANEA

ACOKANTHERA OPPOSITIFOLIA (LAM.) CODD **AND ALLIED SNUFFS**–The South African Zulus, Xhosas and Sothos snuff at least 36 plants as headache/cold-remedies, of which the best-known is the root of apocynaceous arrow-poison plant *Acokanthera oppositifolia* [Neuwinger 1996], and I've already mentioned some headache-snuffs made from other plants. Also used as analgesic snuffs for colds/headaches are: entire *Lycopodium clavatum* L. (Lycopodiaceæ); *Alepidia amatymbica* ECKL. & ZEYH. roots (Apiaceæ); leaves of *Asclepias fruticosa* L. and *A. physocarpa* L. and tubers of *Pachycarpus concolor* MEY., *P. vexillaris* MEY. and *Xysmalobium undulatum* (L.) AIT. F. (Asclepiadaceæ); whole *Crassula lanceolata* (ECKL. & ZEYH.) ENDL. EX WALP. (Crassulaceæ); the slightly-burned wood of *Spirostachys africana* SOND. (Euphorbiaceæ); bark of *Ocotea bullata* (BURCH.) BAILL. (Lauraceæ); bark and roots of *Bersama lucens* (HOCHST.) SZYSZYL. (Melianthaceæ); both leaves and roots of *Plumbago auriculata* LAM. (Plumbaginaceæ); roots of *Rumex sagittatus* THUNB. (Polygonaceæ); and lastly, *Gnidia capitata* L. F. leaves (Thymelæaceæ) [Hutchings & von Staden 1994; Jäger *et al.* 1996].

ANACYCLUS PYRETHRUM (L.) LINK–The root of this African Compositæ is said to be a stimulant, and is employed as a snuff to treat lethargy and epilepsy, and also as a cold-remedy [Boulos 1983]. We lack any chemical or other *data* on this snuff-plant.

ANNONA SENEGALENSIS PERS.–A Malawian snuff inducing *madzoka*, «spirit-possession», is made from roots of *ampoza* or *A. senegalensis* (Annonaceæ), plus the roots of *Securidaca longipedunculata* and the leaves of *Asparagus africanus* and *Chenopodium ambrosioides* [de Smet 1998; Hargreaves 1986]. Kaurene-derived diterpenoids are known from the root-bark of *ampoza*, and trace amounts of three isoquinoline alkaloids, anonaine, isoboldine and liriodenine, are found in the roots of this arrow-poison plant. Root-macerates are used as an analgesic in Senegal, whereas the Zulus «use the roots to treat madness and for dizziness and confusion» [Neuwinger 1996].

ASPARAGUS AFRICANUS LAM.–In Malawi, leaves of *kachachi mkazukwa*, *A. africanus* (Liliaceæ), leaves of *Chenopodium ambrosioides* and the roots both of *Annona senegalensis* and *Securidaca longipedunculata*, yield a snuff taken to induce «spirit-possession», *madzoka*. Both leaves and rhizomes are used in arrow-poisons, while in Benin and Kenya, leaf- and leaf–root-decoctions are used to treat «mental illness»; in Burundi leaf-decoctions are employed to allay «confusion». Preliminary tests showed the leaves to contain alkaloids [de Smet 1998; Hargreaves 1986; Samorini 1996].

CHENOPODIUM AMBROSIOIDES L.–*Chiwanga azimu*, the leaves of this well-known condiment (Chenopodiaceæ)—*epazote*—are compounded with leaves of *Asparagus africanus* and roots of *Annona senegalensis* and *Securidaca longipedunculata* to make a snuff used to provoke *madzoka*, «spirit-possession», in Malawi [de Smet 1998; Hargreaves 1986; Samorini 1996]. In Ghana, this plant is said to be «narcotic», «poison affecting the brain», and «nervine», and likewise employed in unspecified «Santería works» [Andoh 1991]. In Bahia, Brasil, *C. ambrosioides* leaves may be employed for treating «internal pain» in Afro-Brasilian Candomblé-ethnomedicine [Voeks 1997].

CODONANTHOPSIS DISSIMULATA (MOORE) WIEHLER–The Kofán and Siona snuff a leaf-infusion of this Gesneriaceæ for headaches; the stimulating leaves of allied *Columnea picta* KARST. being: «smoked in place of tobacco» [Schultes & Raffauf 1990].

CURTIA CONFORTA (MART.) KNOBLAUCH–The Kubeo Indians pulverize this Gentianaceæ, and snuff it as a treatment for nasal congestion [Schultes & Raffauf 1990].

DIMORPHOCARPA WISLIZENI (ENGELM.) ROLLINS–Crushed seeds and leaves of this brassicaceous plant were used as a snuff by the Western Keres Indians of southwestern North America, apparently as a medicine against colds, although the Zuñi were said to use infusions against delirium and also to make people «talk like fools & drunken men» [Moerman 1998]. We still require chemical and other *data* on this snuff-plant.

ERYTHROPHLEUM SUAVEOLENS (GILL. & PERR.) BREN.–The powdered, dried bark of this Cæsalpiniaceæ «ordeal-tree» species was employed in Ghana as a snuff to treat faintness, and also as snuff in Central Africa for a headache-remedy [Ayensu 1978]. In South Africa, the barks of *E. lasianthum* CORB. and *Albizia adianthifolia* (SCHUM.) WIGHT are likewise snuffed for treating headaches [Hutchings & von Staden 1994].

HELENIUM SPECIES–Various species of *Helenium*—*H. autumnale* L., *H. microcephalum* DC., *H. puberulum* DC. and *H. tenuifolium* NUTT. (Compositæ) were snuffed by divers North American indigenous peoples (powdered leaves, flowers). Their motive appears to have been sternutatory or ptarmic—to induce sneezing and cleaning the nose—for treating colds and headaches and to induce expulsion of afterbirth, and these plants are commonly called «sneezeweeds» [Moerman 1998; Uphof 1968].

LICHTENSTEINIA INTERRUPTA CH. & SCHL.–The epigeal parts of the umbelliferous *L. interrupta* were used in manufacture of a South African snuff, whereas roots were

said to be employed there in confection of «narcotic drinks». The Hottentots were likewise said to prepare «an intoxicating beverage»—*gli*—from *L. pyrethrifolia* CAM. & SCHLECHT. [de Smet 1998; Uphof 1968; Watt & Breyer-Brandwijk 1962]. In Siberia, the umbelliferous herb *Heracleum dulce* FISCH. was eaten as an inebriant: «the effects were similar to alcoholic intoxication» [Brekhman & Sam 1967]; and *H. sphondylium* L. fruits are used in French liqueurs and a Slavic alcoholic drink called *bartsch*, while roots of *H. wallichii* DC. are used in Nepal as a tonic and aphrodisiac [Uphof 1968]. Two Umbelliferæ employed in Chinese medicine, *Peucedanum japonicum* THUNB. and *Siler divaricatum* BENTH. & HOOK. F., are of suspected psychoactivity [Li 1978].

MAGNOLIA VIRGINIANA L.–The leaves or bark of this Magnoliaceæ were insufflated as a «mild dope» by Rappahannock Indians of northeastern North America [Moerman 1998]. Mexican *eloxóchitl/elexóchitl*, *M. dealbata*, has been proposed to represent the lost Aztec entheogen, *poyomatli* [Díaz 1979]. Sometimes called «swamp-sassafras» because of its aroma, *M. virginiana* might contain the psychoactive safrole.

MYRICA PUBESCENS H. & B. EX WILLD. VAR. **GLANDULOSA** CHEV.–Leaves of this Myricaceæ—*ñijni*—were snuffed for headaches by Andean Callawayas [Bastien 1983].

PÆONIA OFFICINALIS RETZ.–The powdered roots of this Ranunculaceæ, *ud al-salib*, are used as a snuff for treating «nervous disorders» in Pakistan, and the plant is sometimes compounded with others for use as a tonic and aphrodisiac [Ghazanfar 1994].

PAULLINIA PINNATA L.–An aphrodisiac-snuff is prepared from the powdered leaves of the sapindaceous *alolongo* or *P. pinnata* (= *Deinbollia pinnata* SCHUM. & THONN.) in the Ivory Coast, whereas in Togo its roots are used as an aphrodisiac. In Burundi, the leaf-decoction is used to treat «madness». Seeds and roots are used as hunting and fishing poisons, much as *P. rugosa* BENTH. EX RADLK. is employed in Amazônia [Ayensu 1978; Neuwinger 1996; Schultes & Raffauf 1990]. Wood of related *Ptæroxylon obliquum* (THUNB.) RADLK. and infusions of *Hippobromus pauciflorus* (L. F.) RADLK. are snuffed for headaches in South Africa [Hutchings & von Staden 1994]. The well-known caffeine-containing stimulant *guaraná* is made from seeds of *P. cupana* (HBK) var. *sorbilis* DUCKE, and *yoco*-bark, of *P. yoco*, is still another Amazonian stimulant quite caffeine-rich [Schultes 1987]. Caffeine, however, has never been found in *P. pinnata*, 'though like *P. cupana* seeds, its leaves contain saponins [Neuwinger 1996].

PYRENOCARPUS LICHEN–The Dení Indians of the Río Cunhuá in Amazonian Brasil

snuff a yellow powder scraped from an unidentified *Pyrenocarpus* lichen that grows on trees, which they call *baduhu-tsiña* or «deer-snuff». This «does not appear to have a narcotic effect» but rather to «cause extreme irritation and a tingling sensation», so to be rather a simple sternutatory, which would make mysterious that «this snuff is taken rather frequently by the Denís» [Prance 1972]. The Tukuna likewise add a yellow lichen to a tobacco-snuff [Wilbert 1987]. Another unidentified lichen, called *jievut hiawsik* or «earth-flower», was said to be smoked as an admixture to tobacco by both Pima and Papago Indians of southwestern North America [Rätsch 1998A].

SALVIA SPECIES–South African Sotho-snuffs were made from *Salvia* species which, like the *Artemisia* species, may contain psychoactive thujone [de Smet 1998; Watt & Breyer-Brandwijk 1962], and the related labiate, *Ocimum canum* SIMS, is said to be used as a sternutatory in Africa [Ayensu 1978], while *Stachys officinalis* (L.) TREV. is used in North Africa as a stimulant and tobacco-substitute snuff [Boulos 1983]. *Ocimum micranthum* WILLD. is an *ayahuasca*-additive [Ott 1999B], and three labiates are snuffed for headaches in South Africa: *Leonotis leonurus* (L.) R. BR., *Mentha longifolia* (L.) L. and *Rabdosiella calycina* (BENTH.) CODD [Hutchings & von Staden 1994]. Flower-buds and leaf-exudate of *L. leonurus* were smoked as marijuana-substitute by South African Hottentots [Ott 1996]. European beer- and wine-fortificant, clary- or muscatel-sage, *S. sclarea* L., is sometimes used as a snuff to treat headaches, extracts still flavor tobacco-snuffs [Duke 1985; Uphof 1968]. There are many psychoactive *Salvia* species, of which the best-known is *S. divinorum* EPL. & JÁT. of Mesoamerica, which contains the most potent visionary natural product isolated, salvinorin A—a human activity-threshold near 50 mcg [Ott 1995]. *Coleus blumei* BENTH., associated ethnomedicinally with *Salvia divinorum* among the Mesoamerican Mazatec Indians [Wasson 1962], is used as a snuff for colds in New Guinea [Duke 1985].

SENECIO SPECIES–*Senecio retrorsus* DC. roots and leaves of *S. speciosus* WILLD. (Compositæ) are snuffed for headaches in South Africa [de Smet 1998; Hutchings & von Staden 1994; Van Wyk *et al.* 1997]; in México, a number of *Senecio* species are called *peyote* (= *péyotl*), suggesting they might be psychoactive [Ott 1996]. In Perú, *S. elatus* HBK is sometimes added to mescaline-rich potions based on *San Pedro*, *Trichocereus pachanoi* (*vide supra*), suggesting likelihood of psychoactivity [Polia Meconi 1996].

SUÆDA ÆGYPTIACA (HASSELQ.) ZOHARY–Stems and leaves of this Arabian Chenopodiaceæ are used as a snuff for the treatment of headaches, dizziness and hysteria, and also snuffed for «calming the nervous system». The ashes of this plant are also add-

ed to tobacco or used simply as a snuff, for unspecified reasons [Ghazanfar 1994].

TAGETES SPECIES–*Tagetes minuta* L. was said to be used as a snuff-plant in South Africa, although this may refer to the use of its ashes as tobacco-snuff admixture [de Smet 1998; Rätsch 1998A]. *Yauhtli*, or *T. lucida*, was an important inebriant in pre-contact Mesoamerica, where such use survives as a fumatory with tobacco among the Huichol [Siegel *et al.* 1977], while the Mixe of Oaxaca make visionary infusions from *zempoalxóchitl*, *T. erecta* [Lipp 1991]. The Mexica (or Aztecs) might have used *yauhtli* as a sort of snuff, inasmuch as this practice was described: «so that sacrificial victims might lose sensibility, [*yauhtli*] was thrown pulverized in their faces» [Sahagún 1950–1969]. The visionary principle of these common composites is unknown. Bioassay of infusions of *T. lucida* provoked «a strong stimulating effect... [we] became quite happily drunk on the tea», whereas snuffing (presumably) the leaves of this species was merely «extremely irritating to the... nose and throat» [Neher 1965].

TERMINALIA SPLENDIDA ENGL. & DIELS.–The powdered bark of this combretaceous tree is used as a snuff by Sudanese women [Uphof 1968], and it was recently reported that the Lodha tribal people of W. Bengal and Orissa, India, sometimes eat the dried kernels of the related *T. bellirica* (GAERT.) ROXB. «for hallucination» [Pal & Jain 1989].

VERATRUM CALIFORNICUM DUR. VAR. **CALIFORNICUM** DUR.–Blackfoot Indians of Canada and the US made a snuff from powdered, dried roots of *V. californicum* var. *californicum* (Liliaceæ), and sometimes snuffed root-pieces to treat headaches, and may likewise have used dried roots of *V. viride* AIT. [Moerman 1998]. This species is described as an ingredient of *kinnikinnick* smoking-blends, for which bearberry, *Arctostaphylos uva-ursi* leaves, is the best-known constituent. The Aztecs also snuffed *V. frigidum* roots for headache [Hernández 1942]. Roots of *V. album* L. are combined with tobacco in flavoring modern European snuffs. *Veratrum* roots may contain high levels of steroidal alkaloids, such as protoveratrine A and B [Rätsch 1998A]. The bulbs of the liliaceous *Eucomis autumnalis* (MILL.) CHITT. are snuffed in South Africa to allay the «pain from old skull wounds» [Hutchings & von Staden 1994].

VISIONARY VETERINARY VADEMECUM: HOUND- AND HORSE-SNUFFS

ACORUS CALAMUS L.–We have already seen that North American Indians snuff the rhizomes and leaves of *muskrat-root* as a cold-remedy [Motley 1994], while in New Guinea, «huntsmen spit chewed sweet flag into the nose of their dogs to promote

their ability to locate game» [de Smet 1985A], much as Sioux Indians of North America would expectorate chewed *A. calamus/americanus* rhizomes into the mouths of puppies, that they might grow-up to become ferocious watchdogs [Morgan 1980]!

BAISSEA AXILLARIS (BENTH.) HUA–The odoriferous roots of this apocynaceous species are rendered into a liquid with fruits of the rubiaceous *Rothmannia urcelliformis* (HIERN.) BULL., to be «inserted into the nostrils and into cuts made in the noses» of dogs by the Mbuti peoples of Zaïre, to enhance hunting ability [Neuwinger 1996].

BANISTERIOPSIS MURICATA (CAV.) CUATR.–Like its relative, *B. caapi*, which we have seen is used both as an adjunct and an additive to human snuffs, *sacha* («wild») *ayahuasca* apparently is given to dogs in Tocache, Perú as a hunting aid, probably using the customary method of squeezing an infusion into the dogs' nares [Russo 1999].

BRUGMANSIA SUAVEOLENS (HUMB. & BONPL. EX WILLD.) BERCHT. & PRESL–As *ain vau*, Kofán of the Ecuadorian Amazônia stimulate dogs' hunting abilities with this well-known shamanic inebriant and *ayahuasca*-additive, likely intranareal application [Russo 1999]; put flower-juice of *B.* x *insignis* (BARB.-RODR.) LOCKWOOD EX SCHULT. into dogs' nares to enhance hunting, and also give the campanulaceous *Centropogon solanifolius* BENTH. to their dogs [Schultes & Raffauf 1990]. The Peruvian Matsigenka make similar use of species of *Brugmansia*, *Brunfelsia* and *Juanulloa* [Shepard 1998].

CALADIUM BICOLOR (AIT.) VENT.–In order to improve their success at hunting peccaries, the Kofán Indians of the Ecuadorian Amazon put a leaf of this species of Araceæ into their hunting-dogs' nares—the plant is cultivated by them [Russo 1999].

CLEMATIS HIRSUTISSIMA L.–The North American Nez Perce Indians would stimulate horses by placing peeled roots of this Ranunculaceæ in their nostrils—so provoking an intense local-irritant effect from contained anemonin [Kern & Cardellina 1983; Morgan 1981]. Stems of *C. brachiata* THUNB. and roots and leaves of *Anemone caffra* ECKL. & ZEYH. are headache-snuffs in South Africa [Hutchings & von Staden 1994]. *Ranunculus acris* L. could be the Chinese delirient *mao-ken* or *shui-lang* [Li 1978].

CYPERUS SPECIES–An infusion from *piripiri*, usually referring to *Cyperus* spp., «may be given to [dogs] to drink or put into [their] nose or eyes» to help them hunt land-turtles, among the Amahuaca Indians of the Peruvian Amazônia [Carneiro 1974]. Two *Cyperus* species have been identified as *ayahuasca* additive-plants [Ott 1999B].

OSTEOPHLŒUM PLATYSPERMUM (DC.) WARB.–Quijos Quichua mixed sap of this Myristicaceæ with *Brugmansia* and *Tabernæmontana sananho* (*vide supra et infra*), put into hunting-dogs' nares to «make them better hunters» [Bennett & Alarcón 1994].

PHYLLOMEDUSA BICOLOR–The Mayoruna and Matses Indians of the Brasilian Amazônia utilize a psychotropic frog-secretion to sharpen their hunting abilities. This is carefully scraped from the skin of a spread-eagled *Phyllomedusa bicolor* frog, then dried and later mixed with saliva to be rubbed into small burns made by a brand on the hunters' skins. «Among the Matses, a dab of the paste may even be placed on the nose of a favored hunting dog to improve its hunting abilities» [Milton 1994].

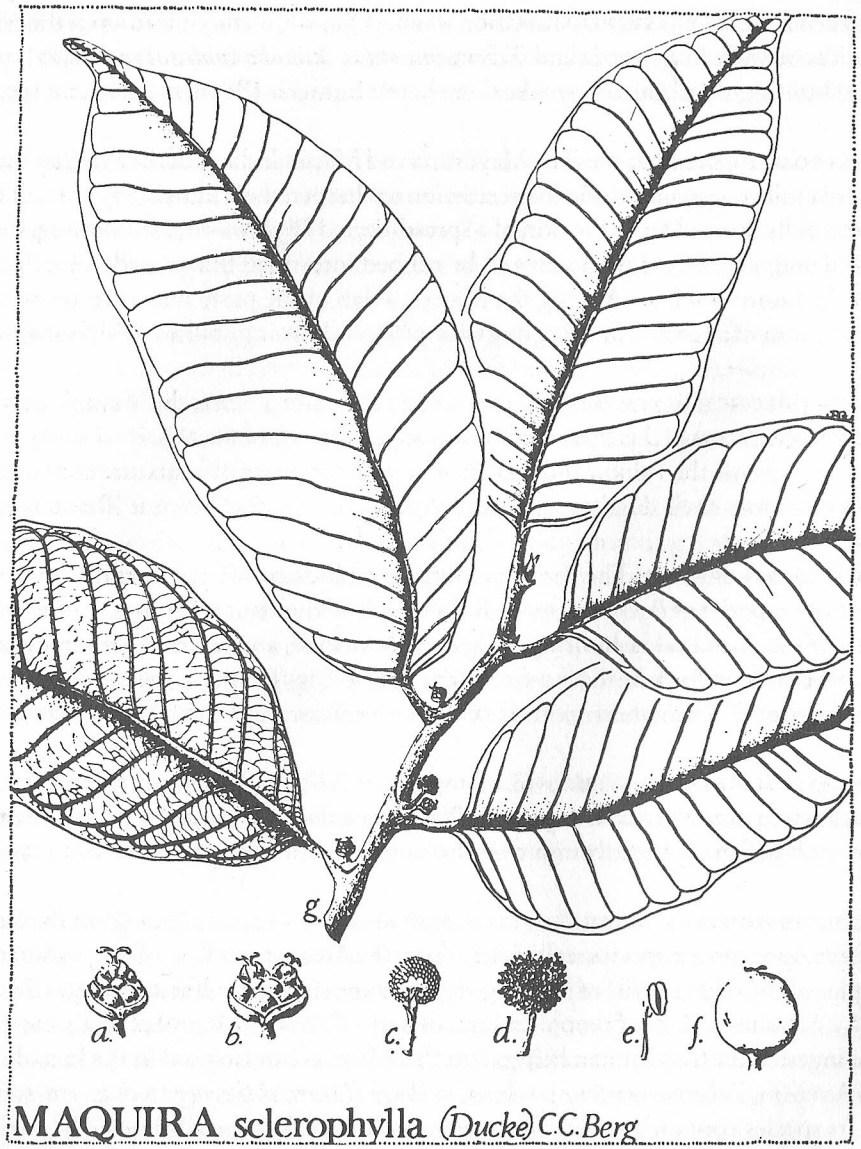
PIPER OBLONGIFOLIUM (KLOTZ.) DC.–Under the name *yemila*, the Wayãpi Indians put crushed roots of this *Piper* in hunting-dogs' nares to enhance their olfactory acuity. As *kahboye*, the Palikur Indians likewise will put drops of a mixture containing this plant into their dogs' nares as part of their training for the hunt [Russo 1999].

PSYCHOTRIA SPECIES–The Peruvian Matsigenka Indians will put an infusion of *tsimerishi*, a species of *Psychotria* in the Rubiaceæ, into their hunting-dogs' snouts, particularly as an aid to the hunting of the *motelo*-tortoise, and leaves of the same plant may be snuffed for a headache-treatment [Russo 1999]. This is the same genus as *chacruna* or *P. viridis*, the important DMT-rich *ayahuasca* additive-plant [Ott 1999B].

SPIGELIA MULTISPICA STEUD.–The Amazonian Palikur Indians mix this species of Loganiaceæ, *kanañumnakamwi*, with *Piper oblongifolium* (*vide supra*) to yield a canine snuff which supposedly improves these animals' hunting-abilities [Russo 1999].

TABERNÆMONTANA SANANHO (RUIZ & PAV.) MARKGR.–A sticky latex from the fruit of this Apocynaceæ species, called *bai su'u* by the Amazonian Siona-Secoya Indians, is placed into the nostrils of hunting-dogs to augment their olfactory range [Russo 1999; Schultes & Raffauf 1990]. Extracts of bark of *tsicta*, most probably *T. sananho*, are ingested both by human beings and their dogs as hunting-aid in the Ecuadorian Amazon. *Tabernæmontana* is related to *iboga*, *Tabernanthe iboga* BAILL., and some of its species contain a variety of the same visionary ibogane alkaloids [Ott 1996].

VIROLA DUCKEI A.C. SMITH–Quijos Quichua mixed sap from this Myristicaceæ with *Brugmansia* and *Tabernæmontana sananho* (*vide supra* and CHAPTER TWO), to place in nares of hunting-dogs to: «make them better hunters» [Bennett & Alarcón 1994].



Maquira sclerophylla (DUCKE) C.C. BERG [Moraceæ], J. Gronim, the fruits of which were used to make *rapé dos índios*, a mysterious visionary snuff from the Rio Xingú of Pará, Brasil.

CHAPTER FIVE

Shamanic-Snuff Psychonautica

> The force seemed to propel the drug from the shaman's tube directly into my bloodstream and then into my very soul. Although my heart pounded painfully in my chest, a subtle sense of exhilaration accompanied the pain that wracked my body. At the edge of my field of vision, tiny figures began to appear. «More», I said to the shaman... Even so, I was beginning to hallucinate. [...] At the edge of my field of vision, the little figures began to dance...
>
> **Mark J. Plotkin**
> *Blood of the Moon, Semen of the Sun* [1993A]

Although there exists a ponderous «drugabuseology»-establishment cranking-out a well-nigh incessant stream of research on compounds arbitrarily classified as *drugs* or *drugs of abuse* [*sic*]—under which rubric are subsumed the visionary tryptamines active in the most important shamanic snuffs—nevertheless we know next to nothing about their human pharmacology in general, less still *via* the intranasal route. To be sure, we possess impressive detail regarding the pharmacology of «drugs» (including DMT and other tryptamines) in laboratory-animals, especially rodents, but inasmuch as such animals are not adepts of psychoptic tryptamine-plants, neither live in cages nor frequent mazes, the bulk of this tendentious zoopery is worse than useless, it is cruel and unethical, besides being wasteful of public funds. We've not even a score of studies on visionary tryptamines in human beings, effectively none as errhines, so the subjacent psychonautic modeling of shamanic snuffs—*pharmañopo* (intranasal/sublingual bufotenine) and *pharmepéna* (intranasal/sublingual 5-MEO-DMT)—all but constitutes the entire literature on this subject. In the course of similarly adumbrating a psychonautic model of *ayahuasca* (*pharmahuasca*), I have reviewed and summarized human pharmacology of tryptaminic PSYCHOPTICA [Ott 1999A,1999B], and hereunder will merely cite such opportunely; focusing rather on a handful of diffident and inconclusive studies of errhinal tryptamines, and a paucity of field-bioassays of diverse shamanic snuffs by a few diligent entheobotanists.

I will also review the controversial research on human pharmacology of bufotenine, chiefly conducted on captive subjects (convicts and «mental patients» [*sic*]), those luckless human *succedanea* for caged guinea-pigs. Pioneered in ancient times by the Persian king Mithridates VI, suchlike repugnant and reprehensible research has been repudiated by the scientific world—some German physicians were condemned to the gallows by the Nürnberg war-crimes tribunals for experimenting on

prisoners at Dachau and other concentration-camps during the monstrous Nazi *régime*. Nevertheless, Usan scientists, under the guise of «non-conventional chemical warfare» studies for the U.S. Army and clandestine «mind-control» research for the U.S. CIA, routinely and cavalierly experimented upon captive and unwitting human subjects in the 1950s and 1960s, with an obsessive fixation on visionary drugs. Such research is perforce unethical, and although animal-experimentation may be justifiable in some fields of biomedical research, conversely it is decidedly unethical in the case of psychoptic and other «drugs of abuse», any investigator's primary focus being their use by human beings. Ethics mandate self-experiments or *psychonautic bioassays* by the researcher her- or himself—the so-called *Heffter-Technique*. Those hewing to that fictive device of «scientific objectivity» might snuffle in disdain over the *subjective* nature of self-experimentation, but our topic is, after all, precisely *the subjective human experience of inebriation*, to which no surrogate animal-model can speak clearly nor intelligibly, nor with so much as a pallid simulacrum of authority. Moreover, the scientific community (both bureaucratic and academic) has bestowed its *imprimatur* on auto-experiments, in the bizarre case of human radiation-studies in the 1950s; rightly deeming unethical, conversely, some entailing dosing of others.

PHARMEPÉNA: 5-METHOXY-DIMETHYLTRYPTAMINE—PSYCHONAUTICS

We saw in CHAPTER TWO that 5-MeO-DMT (or 5-MeO-DMT, here abbreviated simply as M) was the sole or primary psychoptic principle in all 11 *Virola* snuff-samples studied phytochemically (which contained from 0.15–11.0% alkaloids [average 3.63%], and some six samples also contained minor amounts of DMT). The same pattern holds for the sublingual *Virola* pastes—eight samples analyzed had from traces up to 1.88% M, sometimes accompanied by insignificant levels of DMT. Since there is almost no published information on human pharmacology of this important visionary tryptamine, 5-MeO-DMT—and none at all *via* the intranasal and sublingual routes in any species—I decided to model human pharmacology both of *Virola* snuffs (*epéna*) and sublingual «pastes» (*oo-koó-he*), using commercial 5-MeO-DMT free-base (ACROS ORGANICS, Geel, Belgie); which I've also isolated from Peruvian *Virola* resin (courtesy of BORIS CRARY, Tokyo, Japan)—insofar as the precise source and enrichment is recondite, any yield-*data* would be meaningless. These crystalline snuff-analogues and sublingual powders have been denominated *pharmepéna* [Ott 2001B], and my psychonautic bioassays subdivided according to routes of ingestion: intranasal (MN-series); sublingual (MS-series); and oral (MO-series)—whereas sublingual bioassays of this *Virola* paste-source were designated: VS-series.

Merely four reports are published describing bioassays of shamanic inebriants derived from *Virola* species—three involving snuffs, one sublingual pastes. I animadverted at the outset of CHAPTER TWO to Schultes' [1954] pioneering bioassay of a Puinave *yá-kee*-snuff on the Colombian Río Inirida, prepared from barks either of *Virola calophylla* or *V. calophylloidea*. Schultes snuffed: «about one-third of a level teaspoonful of the drug in two inhalations», which «represents about one-quarter the dose usually absorbed». He noted physical symptoms commencing in 15 minutes, building to a «strong and constant headache» followed at 30 minutes by loss of sensation in his extremities and nausea until the three-hour point when, «overcome with a heavy drowsiness... accompanied by a muscular excitation», he retired to his hammock, falling into a fitful sleep at the 4½-hour point. Schultes wrote: «In spite of its many and serious shortcomings, the experiment indicates the narcotic strength of the snuff». A decade and a half later, Schultes and Holmstedt [1968,1971; *vide* Davis 1996] documented the preparation and use of a Waiká-snuff/dart-poison from the resin of *V. theiodora* on the Brasilian Rio Tototobí, as we have seen. During subsequent snuffy festivities, Schultes was surprised when scrapings from the dart-points were blown into his nostrils after the snuff-stash was depleted, and commented of this dart-poison: «It has the same effect as the snuff that was made directly from the fresh resin». Recently, Plotkin [1993A,1993B] has chronicled his impromptu bioassay of a Waiká *epéna*-snuff, which proved highly visionary (see epigram at the beginning of this chapter), having been combined also with *hisiomi* (*Anadenanthera* snuff). In CHAPTER THREE (GUMMING SNUFF) I have already described the McKenna-group's [1984B] bioassays of four *Virola oo-koó-he*-resins from Colombia and Perú.

There have also been three published reports on human pharmacology of pure 5-MeO-DMT. Shulgin was the first to conduct psychonautic bioassays of this tryptamine, documented *via* personal correspondence to de Smet [1983]. In all, nine subjects had inhaled the free-base vapor, which was psychotropic in the 6–10 mg dose-range. Like inhalation of free-base DMT, onset was rapid («less than 60 seconds»), maximal effects attained «in the 2ND TO 3RD minute», withal «largely dissipated at 20 minutes». Further *data* were reported by Shulgin and Shulgin [1997], including intravenous pharmacology. Herein were nine cases of inhalation of vaporized free-base in doses ranging from 6–30 mg. An additional six reports chronicled intravenous injection of doses from 0.25 mg up to 3.1 mg, with even the lowest doses being perceptible, although the active dose was stated as 2–3 mg. From the sparing details given, it would seem the onset *via* intravenous injection is all but immediate, with the duration of the experience compacted to some 10 minutes. A single experiment with 35 mg peroral was described as: «no activity», leading to the conclusion that

5-MeO-DMT is: «like DMT... not orally active». As we shall see below, this conclusion was premature. In my AYAHUASCA ANALOGUES [1999B] I had reviewed preliminary bioassays of 5-MeO-DMT combined orally with MAOI β-carbolines (*pharmahuasca*); these have been greatly extended of late, and I shall return to them below. However incredible it might seem, this is the extent of published *data* on human pharmacology of 5-MeO-DMT and *Virola*, which is why I've not been keeping my nose clean.

5-MeO-DMT–INTRANASAL PSYCHONAUTICS [MN]—I conducted in all six bioassays (MN-I—MN-VI) by way of modeling the *Virola* snuffs. With MN-I, it was established that 10 mg of M free-base was the intranasal threshold-dose, evoking a characteristic pharmacodynamic profile for this compound as errhine: first effects at 3–4 minutes; building to a peak between 30–40 minutes; clearly diminishing by 50 minutes; with termination at about 60–70 minutes. MN-II—MN-V dealt with combinations of β-carbolines with M. The same 10 mg dose was thus combined with 20, 10 and 5 mg (MN-II, MN-III, MN-IV) harmaline hydrochloride dihydrate (HARMALINE; 14.9/7.5/3.7 mg harmaline free-base; ACROS ORGANICS, Geel, Belgie). In each case, I had significant and dramatic potentiation of this threshold-dose of M, irrespective of the diminishing dosage of HARMALINE—that is, even the minimal dose was appreciably as effective as the maximal in this regard. MN-V was a control-experiment insufflating simply 10 mg HARMALINE (or 7.5 mg base), which provoked no noticeable effects. For MN-VI I insufflated 5 mg M with 5 mg harmine hydrochloride dihydrate (HARMINE; 3.7 mg harmine free-base; ACROS ORGANICS), which gave effects commensurate with MN-I (10 mg M neat)—both β-carbolines roughly doubling the potency of M.

5-MeO-DMT–SUBLINGUAL PSYCHONAUTICS [MS]—Seven bioassays with sublingual M (MS-I—MS-VII) sufficed for characterizing its buccal pharmacology, which proved for all intents and purposes to be a mirror-image of intranasal M, with respect to dosage, pharmacodynamics and β-carboline-synergy. In MS-I, 10 mg sublingual M was virtually indistinguishable from that quantity intranasally (MN-I); likewise for MS-II and MS-III (10 mg M + 10 and 5 mg HARMALINE, respectively). For MS-IV I halved the dose of M free-base to 5 mg, with 5 mg HARMALINE (or 3.7 mg base). This gave a threshold-level effect essentially on a par with 10 mg M neat, whether sublingually or intranasally, leading me to estimate that addition of small amounts of HARMALINE approximately doubled the potency of a given dose of M, albeit immaterial with respect to the pharmacodynamics, which remain about the same *cum* or *sans* HARMALINE. This point was underscored by a control-bioassay (MS-V), in which I absorbed simply 10 mg HARMALINE sublingually. Unlike MN-V (the same quantity intranasally),

this inexplicably elicited quite appreciable effects: 12–15 minute incubation; «trippy» sensation and acouasm (tinnitus) at 18 minutes; building to peak by 35–40 minutes, neither stimulating nor exactly sedating, a feeling of «pharmacological possession»; clearly diminishing by 45 minutes and fading away just after one hour. Synergy with M being commensurate in both cases, I am at a loss to explain the dramatic disparity between effects perceived after 10 mg intranasal and sublingual HARMALINE neat. It is quite as singular as it is remarkable that sublingual HARMALINE-pharmacokinetics should be thus virtually congruent with those both of sublingual and intranasal M. Finally, for MS-VI, I comminuted 10 mg of M with 5 mg of HARMINE (3.7 mg base) for dosing, harmine being principal alkaloid of *Banisteriopsis* stems. I could detect no appreciable difference between HARMINE and HARMALINE with regard to potentiation of M, although in this case the experience was stretched-out: visionary effects didn't commence until nigh on 20 minutes, and only at 1:30 was diminution clearly apparent. In MS-VII I bioassayed 10 mg of HARMINE sublingually; no obvious effects. De Smet [1985A] reported neither «a notable psychoactive [n]or somatic effect» following insufflation of 0.5 mg/kg harmine free-base, nor could the drug be detected *via* a chemical assay (sensitive to 2 ng/ml) in blood-samples taken 15, 30, 60, 120 and 240 minutes post-ingestion. This was near fivefold my own dose-level of sublingual harmaline (MS-V)—which had showed incontrovertible psychoactivity, albeit as an HCL salt—although the same 10 mg dose was likewise inactive intranasally (MN-V). Shulgin and Shulgin [1997] reported 300 mg harmine sublingually, the psychonaut: «pleasantly relaxed and withdrawn»; 750 mg effected «dizziness, nausea and ataxia».

5-MeO-DMT–ORAL PSYCHONAUTICS [MO]—We have seen that Shulgin and Shulgin [1997] characterized M as being «not orally active», evidently based on a single bioassay of 35 mg—whether as free-base or salt was not specified—giving only two words to describe the experiment: «no activity». While that *datum* of course stands unchallenged, as I have said, the conclusion was premature. In the course of extensive bioassays of *Pharmahuasca*® (oral M combined with HARMALINE) in Netherlands during November 1998, involving roughly 20 psychonauts, I began to suspect that M showed significant oral activity in its own right. Accordingly, in MO-I, I ingested 30 mg M free-base, encapsulated, to preclude any possibility of contact with my buccal mucosa. By 12 minutes there were signs of activity; fritiniency (tinnitus), euphoria and stimulation at 18 minutes; peaking around 40 minutes, decidedly a threshold-level dose; clearly diminishing at 48 minutes; the «magical varnish» over the world all but evaporated just past one hour. In intensity this was roughly commensurate to 10 mg M sublingually or intranasally (MS-I, MN-I); that is, when exposed to gastric

MAO in my body—as opposed to possible MAO in my buccal or nasal mucosæ—M had about ⅓ the potency. Of course, one facet of biochemical idiosyncrasy is broad variation between individuals with regard to titers of MAO, especially gastric, and I know myself to be a low-MAO phenotype, which could explain why 30 mg of M was decidedly psychoactive for me; contrariwise 35 mg for another psychonaut was not [*vide* Ott 1997]. In the *Pharmahuasca*® bioassay-series, it was established that 10 mg oral M combined with harmaline was the nominal psychoptic dose; 20 mg being potent for many people; 30 mg being too much for some. The highest single dose tested was 50 mg, which proved to be repeatable one hour or so after the first dose had faded. As for harmaline as activator of oral M, 60 mg (expressed as free-base) proved to be the minimal dose which would work for most people—I, however, was able to get activation at the 40 mg-level (with a 10 mg dose of M, which *per se* was inactive for me), whereas a single test with 20 mg M and 50 mg harmaline in five psychonauts was inactive for all, which suggested I tend toward the low-gastric-MAO phenotype. For me some tenfold more harmaline (40 mg : 3.7 mg) had been necessary to activate gastric M *via* MAO-inhibition, as had sufficed to potentiate M in my mouth or nose, presumably *per* a parallel mechanism, suggesting dissolution in gastric juices exposes M either to higher titers of MAO, or for longer periods, or both. On the other hand, tripling the gastric dose of M, absent MAOI, was sufficient to overcome gastric MAO. In any case, it would be more conservative (*i.e.* lower alkaloid-load) simply to ingest more M orally, as opposed to taking lower doses *cum* MAOI, and be more sensible still to ingest combinations of M with these minuscule doses of harmaline sublingually or intranasally. Nevertheless, in the case of *Pharmahuasca*,® the duration of the experience is prolonged—as opposed to the rapid onset of a 50–60 minute effect, with *Pharmahuasca*® the incubation-period extends about one hour, at times 1.5 hours, and the effects last some two hours (or longer for some), roughly evenly partitioned into plateau- and descent-phases. In my experience, there is no significant difference in basic pharmacodynamics between M and DMT in *pharmahuasca* [*vide* Ott 1999B].

VIROLA-RESIN–SUBLINGUAL PSYCHONAUTICS [VS]—I conducted three experiments with a commercially-available *Virola* resin (courtesy of BORIS CRARY, Tokyo, Japan), prepared pursuant to traditional (Bora and Witoto) methods in Perú, from *cumala*-bark (*V. calophylloidea*, *V. calophylla* or *V. peruviana*). For VS-I, I ingested sublingually a *bolus* of 1.0 g of this thick paste, coated in wood-ashes. Beginning at 8–10 minutes I detected a definite tryptaminic activity, which alas did not develop much and was evident up to the one-hour point—subthreshold. Accordingly, for VS-II I triturated 1.0 g of resin with 10 mg HARMALINE and 0.25 g sodium bicarbonate, coating the

bolus in cocoa-powder and, once dissolved, leaving it in my mouth until 45 minutes had elapsed. This elicited a mild, threshold-level effect, much like MS-III (10 mg of M + 5 mg HARMALINE sublingually). For VS-III, I doubled that dose, to 2.0 g, two *boli* prepared as *per* VS-II. This effected a sensibly-stronger response than VS-II, albeit still mild; decidedly tryptamine-like, but with additional pharmacological grace-notes.

PHARMAÑOPO: BUFOTENINE–PSYCHONAUTICS

John Marks [1979] has chronicled the shameful history of the clandestine Usan CIA «mind-control» project MKULTRA and its predecessor ARTICHOKE, with which «the company» sought to appropriate divers fruits of meretriciously-financed academic research to its own perverse ends—development of pharmacological interrogation-technology and an arsenal of «non-conventional» chemical weaponry. Bufotenine was one of more than 800 compounds tested duplicitously under the direction of Harris S. Isbell at the U.S. Public Health Service Addiction Research Center Hospital (officially classified as a penitentiary) in Lexington, Kentucky (of which he was then director) as well as 14 other penal institutions and «mental hospitals» [Lee & Shlain 1992]. Fabing and Hawkins [1956] first reported on intravenous injection of the creatinine-sulfate salt of bufotenine (received from Upjohn Co.) into four hapless convicts at the Ohio State Penitentiary in 1955. Five experiments were conducted, using doses of 1, 2, 4, 8 and 16 mg, injected «slowly and steadily over a 3-minute period». These unethical bioassays provoked parlous cardiovascular effects: «If the color of an eggplant were diluted, it would approximate the unique purple hue of the faces of these subjects», and even the 1 mg dose provoked corporeal pain and nausea. Only the subjects receiving 4 and 8 mg seemed in any way to enjoy their experiences, and these doses as well as 16 mg evoked transient visual phenomena: all subjects reported seeing brightly-colored, errant spots, leading the authors to conclude bufotenine was «hallucinogenic», being «reminiscent of LSD_{25} and mescaline», with which they were obviously wholly unfamiliar. Duration of these effects increased in proportion as the dose was augmented—from 6 minutes for 1 mg, to about an hour for 16 mg.

Turner and Merlis [1959] then catalogued their own perverse experiments using bufotenine, DMT and their laboratory-analogue of *Anadenanthera* snuff, on helpless «mental patients» [*sic*] (non-convict prisoners of the Central Islip State Hospital in New York), as well as others by Isbell, employing «NIH-snuff» (*vide* CHAPTER ONE) and intranasal bufotenine. Isbell had experimented with doses up to 1.0 g of NIH-snuff repeated at intervals of 30 minutes, observing «neither subjective nor objective effects». The same negative results followed: «spraying with as much as 40 mg. of

bufotenine creatinine sulfate» (presumably into the nostrils—this would correspond to 14.3 mg bufotenine-base). When bufotenine as free-base or creatinine-sulfate salt was «blown into the nares» by Turner and Merlis, 6–10 mg doses produced: «fear, associated with flushing of the face, lacrimation [*sic*], tachycardia, and tachypnea». They were quite «unable to induce an intoxication [*sic*] by the use of the snuff» in doses as high as 560 mg, «containing approximately 6 mg. of bufotenine» (or 1.1%). Bufotenine was then injected intravenously into 14 «schizophrenics» in doses up to 20 mg, which predictably caused circulatory crises («plum-colored» face), making the «patients»: «frightened to an extreme degree»! Unbelievably, these mad doctors injected bufotenine into five «patients» «as they were coming out of insulin-coma or following EST [Electro-shock Therapy (*sic*)]», and into three others after administration of reserpine or chlorpromazine: «Each of these injections almost proved fatal in small amounts (between 2.5 and 5.0 mg.)». Following reserpine, one victim: «ceased to breathe after but one deep inhalation and resumed breathing only after a minute or so of artificial respiration»! Turner and Merlis remarked offhandedly: «Never have we obtained evidence of disturbance of sensation of any modality, particularly no visual or auditory disturbance *aside from that associated with loss of consciousness*» (italics mine), although they cited intramuscular injections of bufotenine by Isbell—in doses between 10–12.5 mg—as having provoked «hallucinations» or psychoptic phenomena: «These consisted of a play of colors, lights, and patterns».

The group of Bonhour [1967] experimented upon 14 «patients» in an Argentine «mental hospital», injecting bufotenine (mono-?) oxalate intravenously in doses as high as 16 mg; «psychic alterations» commencing above 12 mg (12–16 mg bufotenine mono-oxalate = 8.4–11.1 mg base; or of bufotenine bi-oxalate = 6.4–8.5 mg). Again, there was profound physical discomfort at doses in excess of 6 mg (4.2 [or 3.2] mg bufotenine-base): nausea, lividity, a feeling of being «about to die», and the higher doses provoked an intensification of color-perception, colored hallucinations and other psychoptic phenomena, accompanied by ego-dissolution and depersonalization in five assays, lasting approximately two hours; in some cases up to two days.

In the unique published report involving a truly voluntary subject, McLeod and Sitaram [1985] documented intranasal and intravenous administration of bufotenine oxalate to a single subject «with previous experience with a number of hallucinogenic substances». «Intense local irritation» was the only effect found after solutions of 1, 2, 4, 8, and 16 mg (apparently expressed as free-base) bufotenine oxalate were «placed on the nasal mucosa». The same subject was later given 2, 4 and 8 mg of bufotenine (as base) *per* intravenous injections of the oxalate salt. The lower doses provoked but anxiety, whereas 8 mg elicited: «profound emotional and perceptual changes…

extreme anxiety, a sense that death was imminent, and a visual disturbance which was associated with colour reversal and distortion». Immersed in the semiotic confusion ever dogging this field, the authors concluded that with bufotenine: «frank hallucinations *per se* were not present», although it was «a psychotomimetic agent».

There are a handful of accounts of psychonautic bioassays with *Anadenanthera* snuffs. Pagés Larraya [1959] gave an interesting report of his extensive tests of toasted, crushed seeds of *A. colubrina* var. *Cebil* from Argentina. To achieve the maximal effects of *cebíl*-snuff, he «always used an amount of the powder that would fill to the brim» the depressions in typical snuff-trays, or «100 g»! I assume this be a misprint, and he in fact meant 10 g, which itself would be a massive dose to snuff. While he tells us not how many bioassays were conducted, these were spread out over three months, and it is evident led Pagés Larraya to plumb the depths of *cebíl*-inebriation. He described depersonalization, stupor and experiences «consubstantial with consciousness of the numinous», also noting how his *psyche* became: «saturated anew with unnatural terror due to my certainty I was party to some mystery surpassing known limits», in which cases he would always be «as though removed from reality for some hours». Wassén and Holmstedt [1963] animadverted to an early account of Snethlage [1937], in which he described insufflation of an Amniapä-snuff consisting of: «angico [*Anadenanthera*?] seeds, tobacco-powder and the ash of some bark». With snuff-experts C. Manuel Torres and Agustín Llagostera, I assayed *cebíl* seed-snuff in northern Chile [Ott 1995c], using seeds we had collected in northern Argentina. Even a pea-sized, unilateral insufflation (AN-1) of the crushed, toasted seeds evoked a mild but distinct effect, following which we diluted the powder with a bit of sodium bicarbonate—both being a base, in emulation of ashen additives, and as a pharmaceutical drying-agent, to facilitate finer pulverization, hence more extensive dispersal over our nasal mucosæ. Snuffing a double amount bilaterally (AN-II) provoked distinct visionary effects in us all, commencing in a few minutes and peaking in five, with a 10-minute plateau and 15-minute descent in my case. There was only a slight and transient physical discomfort attending the «rush», succeeded by tryptamine-like tinnitus and sinuous, multihued, arabesque patterns, first viewed behind closed eyes, then on a stuccoed wall in a darkened hallway, at length even on surfaces in the kitchen-laboratory illuminated *via* a skylight by the crepuscular, desert sun.

The following January, at the ENTHEOBOTANY SEMINARS in Palenque, Chiapas, a subsequent collaborator in our *cebíl* snuff-study, Christian Rätsch [1996a], ingested bilaterally approximately 0.5 g of this *cebíl*-snuff, and he gave a superb account of his fantastic visionary experience, including drawings of sinuous art-motifs from Chiapas and from a famous carving at Chavín de Huántar, Perú, which he had lik-

ened to his *cebíl*-visions. The following year, Castillo [1997] published his visionary experience from having snuffed a Piaroa *yúwa*-powder (*A. peregrina* var. *peregrina*) in Venezuela, after he had chewed a piece of *capí* liana-stem, doubtless *Banisteriopsis caapi*; and I have cited Plotkin's [1993A,1993B] bioassay of Waiká *hisiomi-* plus *epéna*-snuffs. Numerous additional bioassays by me and others in my presence have established that *cebíl* seed-powder is even more potent smoked—alone or with tobacco (as be presently the custom among the Wichi of Argentina)—than it is as an errhine. My bufotenine-bioassays were designated *pharmañopo* [Ott 2001A], and again subdivided according to ingestion route: intraNasal (BN-series); sublingual (BS-series); oral (BO-series); vaporized and inhaled (BV-series); finally, intraRectal (BR-series).

ISOLATION AND PURIFICATION OF BUFOTENINE—From a mixed collection of seeds of *Anadenanthera colubrina* var. *Cebil* gathered in northern Argentina, 125 g were ground in a small blender-jar, then twice extracted by stirring for 8 hours in 500 ml 96% ethanol acidified up to 1% tartaric acid. The combined, filtered extracts were concentrated under reduced pressure and below 50°C to 150 ml, which was transferred to a separatory-funnel and diluted with 200 ml water, the pH adjusted to 3–4 by addition of concentrated hydrochloric acid reagent. Considerable fat precipitated from the ethanol on dilution with water. The solution was defatted, extracting 6X with 30 ml chloroform, which was set aside. The defatted extract was basified to pH 8–9 by addition of ammonium hydroxide reagent, then extracted 8X with 200 ml chloroform, the combined chloroform-extracts evaporated under reduced pressure to yield a foamy, yellowish oil which dissolved completely in 50 ml hot ethyl acetate. This solution was concentrated to 15 ml and left overnight under refrigeration. The following day there were a brace of tiny rosettes of dark-brownish crystals forming at the base of the flask, which was alternated between periods under refrigeration and standing unstoppered at room-temperature, resulting in the formation over 48 hours of large masses—some larger than a centimeter—of dark-brownish, prismatic crystals. I decanted the mother-liquor, rinsed this crystalline mass with cold ethyl acetate dried over magnesium sulfate, then dried the crystals under reduced pressure, recovering 4.1 g of large, free-flowing, sparkling (albeit brownish) crystals with a melting-point of 125–126°C. These were twice recrystallized from dry ethyl acetate yielding 3.87 g off-white bufotenine free-base crystals (3.10%); despite loss of chromophores on successive recrystallizations, the melting-point remained 124–126°C. Six reports of isolated bufotenine free-base, from *Amanita citrina* (SCHAEFFER) GRAY [Wieland & Motzel 1953] and *Anadenanthera* species [Alvares Pereira 1957; Iacobucci & Rúveda 1964; Pachter *et al.* 1959; Rendón 1985; Stromberg 1954], disclosed a brace

of crystalline isoforms from ethyl acetate: one melting from [123–]124–126[–129]°C and the other 146–147[–150]°C. Furthermore, two reports of synthetic material gave distinct melting-points from ethyl acetate: 146–147°C [Speeter & Anthony 1954] and 138–140°C [Stoll *et al.* 1955], indicative of yet a third isoform—in all cases involving the lower-melting-point isoforms, repeated recrystallizations and further purifications did not alter the melting-point, as I also observed. On the other hand, Iacobucci and Rúveda [1964] showed that seeding a recrystallization-solution with crystals having a 146–147°C melting-point gave only crystals of that type; the lower-melting-point isoform (their initial isolated material melted at 123–124°C) could not be regenerated by reversing such operation. By manipulating some conditions of recrystallizations (always from ethyl acetate), I was able to produce crystals melting at 145–147°C, and also found seeding a saturated-solution of my lower-melting-point crystals with the higher-melting isoform gave only crystals of the latter type. This phenomenon has been reported for DMT free-base, which likewise seems to crystallize as three distinct isoforms from hexane; melting-points from 44–74°C having been reported [Shulgin & Shulgin 1997]. As was the case with bufotenine, the Fish-group [1956] synthesized DMT free-base, which melted at 47–49°C from hexane—whereas seeding of solutions with «an authentic specimen of m.p. 73–74°» gave only crystals melting at 71–73°C.

BUFOTENINE–INTRANASAL PSYCHONAUTICS [BN]—Nine bioassays (BN-I–BN-IX: 5, 10, 20, 30, 40, 50, 60, 80, 100 mg) enabled me to establish the visionary intranasal threshold-dose of bufotenine. Insufflating 40 mg of bufotenine free-base in BN-V indubitably led me to the visionary threshold, with the following pharmacodynamics: the first signs of activity (tintinnation) at 5 minutes; clear tryptaminic body-effects at 25 minutes; peak between 35–40 minutes, with unmistakable diminution by 50 minutes; and evanescent after-effects up to 90 minutes. Even 5, 10, 20 and 30 mg of bufotenine free-base (BN-I–BN-IV) were perceptibly psychoactive in every case, there commencing closed-eye luminosity and scintillation at 20 mg (BN-III), whereas 30 mg in BN-IV brought me tantalizingly close to the threshold: tinnitus commencing at 18 minutes; closed-eye luminosity at 32 minutes; all the characteristic bodily sensations of tryptamines being evident by 36 minutes, albeit *sans* further psychoptic manifestation; with peak attained at 45 minutes and a clear diminution at 60. Like *cebíl*-seeds snuffed and smoked, intranasal bufotenine free-base is throughout quite physically relaxing, and in no case was there facial rubescence, nor any scintilla of discomfort; nary a disquieting, disesteeming side-effect. BN-VI–BN-VIII (50, 60, 80 mg bufotenine free-base) gave progressively stronger effects with similar pharmacodynamics. In BN-IX, I snuffed 100 mg bufotenine free-base alone, which departed

from lower doses in that colored patterns with eyes closed presented at 15 minutes. Strangely, absent nausea, I vomited thrice at 35 minutes, which didn't happen with the same dose orally (BO-I). For BN-X, I snuffed 25 mg bufotenine comminuted with 12 mg HARMALINE—as with intranasal 5-MEO-DMT, this appeared roughly to double the potency, commensurate with 50 mg bufotenine neat; while in BN-XI—5 mg HARMINE insufflated with 40 mg bufotenine—there may have been too little HARMINE for potentiation—effects were weaker than I had anticipated. Not so BN-XII, 50 mg bufotenine plus 10 mg HARMINE; stronger than BN-VIII (80 mg bufotenine neat). Emulating Piaroa, Pumé and Guahibo chewing of *Banisteriopsis* prior to taking *Anadenanthera* snuffs, for BN-XIII I took 20 mg HARMALINE sublingually, 20 minutes prior to insufflating 50 mg bufotenine—this seemed sensibly stronger than BN-VI (50 mg B, IN), but I daren't assert a pharmacological rationale for the Indian practice.

BUFOTENINE–SUBLINGUAL PSYCHONAUTICS [BS]—In BS-I, I ingested 50 mg bufotenine free-base sublingually, which—again like 5-MEO-DMT—was roughly equivalent both as to intensity and pharmacodynamics, to the same dose applied intranasally (BN-VI). For BS-II, I took 50 mg bufotenine plus 10 mg HARMALINE, which was appreciably stronger, roughly comparable to BN-XII (50 mg B + 10 mg HARMINE, IN).

BUFOTENINE–ORAL PSYCHONAUTICS [BO]—We have seen that in this century Piro Indians of the Peruvian *montaña* were reported to ingest *Anadenanthera* seeds orally, in 1539 the Incans were said to add *vilca* (perhaps *Anadenanthera* seeds) to divinatory *chichas*, and in 1703 the Allentiac and Millcayac Indians were described as chewing *cibil*-seeds like *coca*, as a stimulant. Based on his personal bioassays, Hofmann [1963] noted 50 mg oral bufotenine had been inactive, while Wassén and Holmstedt [1963] cited a personal communication from Isbell, regarding his cruel «research» for the CIA, to the effect that: «oral ingestion of bufotenine in doses running up to 100 mg (total dose)... were without effect»—from the loose wording of Isbell's statement, it is unclear whether he meant that 100 mg had been administered orally *as a single dose*, nor did he specify whether this referred to free-base or a creatinine-sulfate salt. I highly doubt he had administered any single dose of 100 mg bufotenine free-base, inasmuch as I ingested that quantity encapsulated in BO-I, and it was most decidedly active, albeit mild. I felt first activity—tinnitus—at 20 minutes, which developed slowly and lasted a total of roughly two hours. At the peak, around the 1:30 point, there was a subtle, scintillant «strobe-effect» thoughout the visual field in low light, lasting about 30 minutes, but absent classic tryptaminic colored patterns. In BO-II, I swallowed a capsule with 20 mg bufotenine plus 53 mg HARMALINE (40 mg base).

This was but scant less potent than BO-I (100 mg B)—the same pharmacodynamics.

BUFOTENINE–VAPORIZED PSYCHONAUTICS [BV]—When I recovered my first crystals of presumed bufotenine, to aid in characterizing these, I placed a few milligrams on aluminum-foil to ascertain any melting characteristics, whether it would exude a visible vapor, and in which case I could detect the classic tryptamine-like odor to such vapor. This indeed proved to be the case, and instead of merely whiffing a trace of the vapor indirectly, I rather inhaled some through my nose. To my astonished delight, this was surprisingly active—accordingly designated BV-I—leading me to interrupt laboratory-work to recline outside in the darkness at the edge of the forest to observe and enjoy the unexpected bioassay. Since I have no idea of the dose, it makes no sense to describe the experience. Thenceforth in my bufotenine-vapor experiments, I carefully vaporized over an alcohol-lamp doses weighed onto a piece of thick aluminum-foil made into a semi-ball, in the opening of which would fit the flared end of a female-ball-joint-tipped glass-tube. I was thus able to capture all of the vapor, and furthermore able to weigh the foil and tube before and after to ensure I had inhaled the entire dose. For BV-II—BV-V, I inhaled and retained for at least 45 seconds the vapors of 2, 4, 6 and 8 mg of bufotenine free-base. All four doses were psychoactive, increasing in intensity in proportion to dosage, but all showing the same approximate pharmacodynamics, except for the time of onset which, at 45, 35, 25 and 18 seconds, decreased as the dose was augmented. By 2 minutes there was the first clear signal, tinnitus, a peak between 4 and 5 minutes, unmistakable diminution by 7–9 minutes, with lessening effects evident for a full hour—even the 2 mg dose had perceptible after-effects to the 90-minute point! In BV-II–BV-IV, the psychoptic effects were limited to a shimmering «magical varnish» over the world in low light, accompanied by psithurism; while in BV-V (8 mg), at 7–8 minutes, there were ring-like, swirling colored patterns with eyes closed; visible but fainter, with eyes opened in low light. For BV-VI, I inhaled *intranasally* the vapor of 2 mg bufotenine, which gave an effect stronger than the same dose in BV-II (inhaled through the mouth), oddly with retarded pharmacodynamics: first effects at 1:20, tinitus at 3 minutes, 5–6 minute peak, with closed-eye luminosity and scintillation at the 8-minute point.

BUFOTENINE–INTRARECTAL PSYCHONAUTICS [BR]—Inasmuch as Katawishi, Maué and Omagua Indians were reported to inject *Anadenanthera* seed- and leaf-clysters, it seemed apposite to probe intrarectal bufotenine-pharmacology. De Smet [1983] had found up to 125 mg DMT (as <185 mg bioxalate salt in 15 ml water) to be: «without any discernible effect»—I suspect such high doses of the free-base would have been

dramatically active. For BR-I I confected a suppository by triturating 30 mg bufotenine with 0.25 g sodium bicarbonate into a gram of cacao-butter. Mild physical, *sans* psychoptic, effects developed quickly and lasted roughly an hour. For BR-II, I inserted an identical suppository with addition of 10 mg HARMALINE, which proved to be subthreshold. Finally, in BR-III, a 50 mg bufotenine-suppository with 10 mg HARMALINE, threshold-level psychoptic effects resulted. Initial tinnitus commencing at 15 minutes led to closed-eye scintillation and luminosity at the peak, around 45 minutes, followed by the characteristic, shimmery «magic varnish» over the world.

PHARMANUNU AND PHARMAMBÍL: NICOTINE–PSYCHONAUTICS

Exemplary of «psychonautic posology» is my detailed review of nicotine-pharmacology [*Merck Index* 12: 6611; *Pharmacotheon* NO. 36] in PHARMACOPHILIA OR THE NATURAL PARADISES [1997]; especially comparative pharmacodynamics of tobacco and intranasal, buccal and pulmonary nicotine—an interested reader will find relevant bibliographic citations therein [*vide item*: Ott 2001c]. I'll merely summarize salient highlights of my comprehensive psychonautic bioassays of tobaccos and nicotine.

NICOTINE–INTRANASAL PSYCHONAUTICS [NN]—I began modeling *pharmanunu* employing the pharmaceutical preparation *Nicotrol* NS® (NN-I and NN-II), a pump-sprayer calibrated to deliver a mist of 0.5 mg nicotine into each nostril—this is sold by prescription only, and grossly overpriced, at some US$50 for 100 mg (10 ml @ 10 mg/ml). In these two experiments, I insufflated first single, and then double, sprays into each nostril (1.0 and 2.0 mg nicotine, respectively). Not only is this product no bargain, but the spray is so irritating that it provokes repeated sneezing, and I was never able to absorb enough to enjoy the nicotine—I highly commend it as a sternutatory, but as a nicotine-delivery device, it is worthless. Any pharmacist worth her salt could come up with a far better formulation in a single, short afternoon in the apothecary-lab. With a refillable pump-sprayer such as used for dispensing asthma-medications—which one can calibrate simply by adding a known amount of liquid and counting the number of sprays yielded—I prepared my own stock-solutions of nicotine free-base (which is a light oil miscible with water) for further experiments. In NN-III, I insufflated 1.0 mg nicotine in a single spray into each nostril, which gave barely-perceptible results. Doubling the concentration, in NN-IV I administered 2.0 mg bilaterally, for a total dose of 4.0 mg. This was quite satisfactory, provoking a rapid (25–30 seconds) nicotine-rush, which peaked in 2–3 minutes, with a fine cerebral stimulation perceptible for about an hour. Although far less irritating than the

Nicotrol® this still effected noisome nasal irritation, a transient burning sensation akin to piquant *chile*-alkaloid capsaicine [*Merck Index* 12: 1811]. Accordingly, for NN-V I added the local anæsthetic procaine HCL [*Merck Index* 12: 7937] to nicotine-solutions, so that each spray deliver 10 mg procaine and 2.0 mg nicotine. This largely—but not fully—ameliorated the burning from nicotine, particularly during repeated applications, and other local anæsthetics have likewise been tried with great success.

The crystalline bitartrate salt of nicotine proved to be all but worthless as a medium of nicotine-delivery, and was only effective if basified sufficiently with sodium bicarbonate so as to neutralize the tartaric acid. Procaine is psychoactive in its own right, possibly an MAOI, and prototypical «smart drug» in the Romanian *Gerovital*® (GH-3) [Dean & Morgenthaler 1990]. Given probable neuroprotectivity of nicotine against Alzheimer's Disease and Parkinsonism, we've makings of a nöotropic «smart snuff»; while a new company develops a *pulmonary* snuff-technology I highlighted in PHARMACOPHILIA [Inhale 1999]. Procaine in high intravenous doses appears to have visionary properties—in 32 human subjects, all had auditory «hallucinations» and nine reported psychoptic effects. Whereas nine subjects experienced only fear and anxiety, another nine were instead treated to *intense* euphoria [Perrine 1996]!

NICOTINE–SUBLINGUAL PSYCHONAUTICS [NS]—Again utilizing standard-solutions of nicotine, I commenced modeling sublingual nicotine, *pharmambíl*. In NS-I, 1.0 mg of sublingual nicotine produced negligible results and 2.0 mg (NS-II) was barely perceptible. In NS-III, 4.0 mg gave a rapid and satisfying nicotine-rush, commencing within 25–30 seconds and lasting until 3 minutes. But 8.4 mg sublingual nicotine (NS-IV) first thing in the morning proved excessive, producing dizziness, causing me to rinse-out my mouth at once, although I have easily tolerated doses as high as 15 mg nicotine during repeated ingestion, bespeaking rapid development of tolerance. For NS-V and NS-VI, I spaced two 8.4 mg doses by exactly one hour, the second being significantly weaker; I repeated this experiment (NS-VII and NS-VIII), but left 2 hours and 15 minutes between doses—the second dose was nearly as powerful as the first, suggesting nicotine-tolerance lasts some 3 hours. Such tolerance as rapidly disappears. In contrast to drugabuseology-doctrine, I've never experienced the slightest nicotine-withdrawal syndrome, even following prolonged ingestion, exceeding 100 mg/day.

I also made preliminary experiments with buccal *chimó* or *ambíl*, confected by steeping fresh tobacco-leaves from my garden in water, periodically heated to near boiling, for some 24 hours, after which the leaves were expressed, then their filtered juice inspissated, by simmering on low heat. During this process I added wood-ash-leachate and flavorings (crushed, dried leaves of *Justicia pectoralis*, *Vanilla* pod and

crushed ginger-rhizome), lastly sweetening with honey prior to the final concentration, to a consistency of hard taffy when cooled. This *chimó* had a delightful taste of caramel, although I had been careful never to burn it, nor to allow boiling during the concentration, inasmuch as nicotine would have steam-distilled off. About a 2 g *bolus* stuck to my lower front-teeth would dissolve under my tongue and produce a mild sublingual nicotine-effect (I knew from fumatory bioassays my wild tobacco was rather weak, hence I enriched the *chimó* with nicotine for stronger stimulation).

NICOTINE–ORAL PSYCHONAUTICS [NO]—The best-known medicinal nicotine-delivery modality is *Nicorette*® chewing-gum (squares of gum with 2 and 4 mg doses of nicotine polacrilex), and human pharmacological research suggests it is an inefficient means of nicotine-delivery. In NO-I, I found a 2 mg dose of nicotine-gum to have barely-perceptible effects, even upon rapid and vigorous chewing. A single 4 mg dose (NO-II) of *Nicorette*,® again ruminated rapidly, led to a mild nicotine-stimulation, but such chewing led me to swallow a goodly portion of the nicotine, which quickly produced singultus (yexes or hiccups), lasting a minute or so. Finally, in NO-III, masticating two 4 mg pieces of gum (8 mg nicotine), I was able to achieve a decent stimulation from nicotine, albeit building slowly, absent any pleasurable rush.

SNUFFY MISCELLANEA, BY WAY OF CONCLUSION

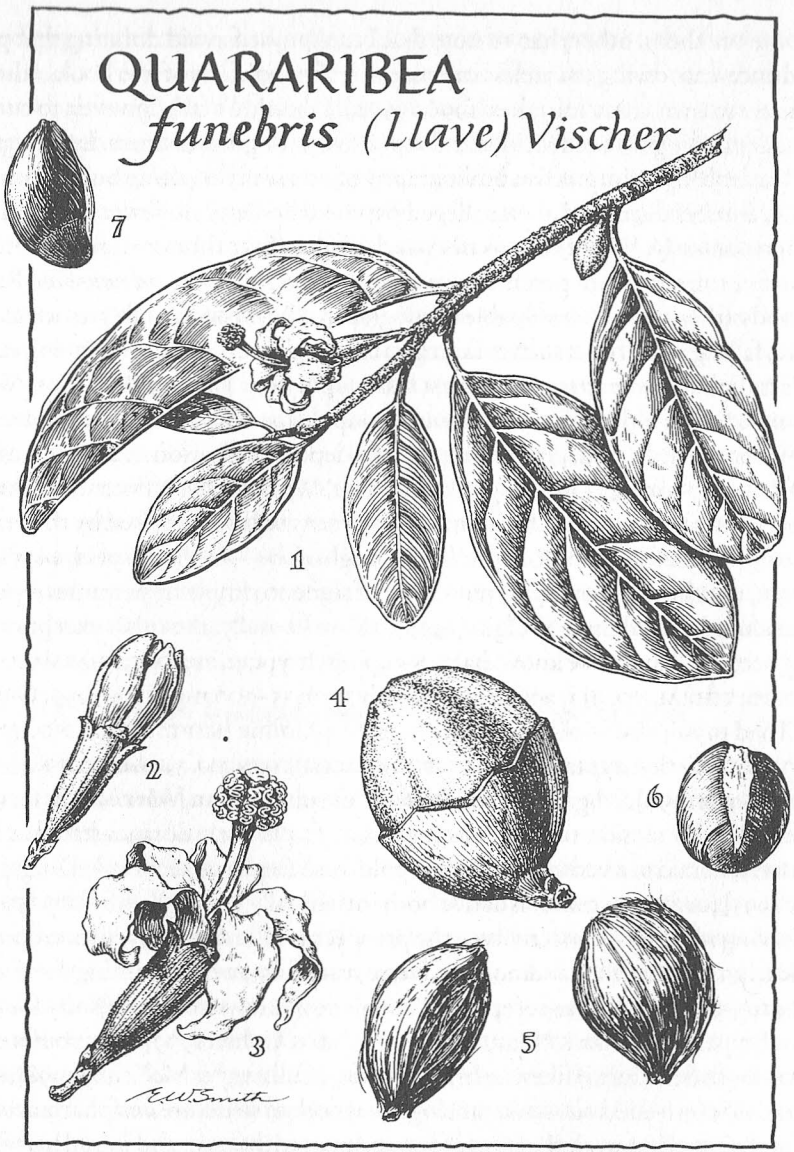
Based on my intranasal and sublingual bioassays of 5-MEO-DMT and abundant phytochemical *data* showing this to be the main or sole tryptamine in *Virola* snuffs and «oral» pastes, I confidently assert this compound to be the major psychoptic principle of shamanic *Virola* preparations. *Oo-koó-he*-pastes likely do not contain enough tryptamines for oral activity—as McKenna's bioassay showed—although as little as 1.0 g of the same sample swallowed (1.5–2.0 g) would represent an active sublingual dose; even less with addition of *Banisteriopsis* liana—since similar tobacco-pastes at times also contain such, this may point to further degeneracy of this pharmacognosy.

By the same token, based on some two dozen bioassays of bufotenine, extensive experience with *cebil*-seed as snuff and fumatory, and consistent phytochemical *data* showing bufotenine be by far the principal tryptamine in *Anadenanthera* seeds, I confidently assert that bufotenine is the major inebriating principle of *ñopo*-snuffs; likewise of Incan *vilca-chichas* and Mura/Omagua-potions (taken orally or rectally); *Anadenanthera* leaf-snuffs (as Omagua-*curupá*) would owe activity to 5-MEO-DMT.

Erroneous statements *in re* bufotenine-psychoactivity and oral activity (also of 5-MEO-DMT) are legion, and it would be a tedious and invidious exercise to endeavor

to enumerate them, other than to note that I can't myself avoid donning that particular dunce-cap, owing to careless statements in first editions of two books, 'though I endeavor to correct my mistakes [1996,1999B]. I shouldn't fail, however, to cite one paper outstanding for tendentious and repetitive wrong-headedness. Lyttle's group [1996] assembled an impressive bibliography of 600 sources (citing but 134) on bufotenine, *a priori* dismissed as «an alleged psychedelic», and no fewer than 16 times stated erroneously: bufotenine «is not psychedelic» (four times); «is not hallucinogenic» (five times); «is not psychoactive» (seven times); *etc.*, *etc.*, *ad nauseam*. Rather than study (then cite) their valuable bibliography, they relied notably on secondary sources, falling into errors, such as failing to cite Isbell's subjects experiencing «a play of colors, lights, and patterns», after IM bufotenine [*per* Davis & Weil 1992; Weil & Davis 1994?]; and although the Bonhour-group's paper [1967] was *listed*, it was not cited nor apparently read, given its report of: «depersonalization… flow or gushing of colors… euphori[a]» following IV bufotenine! Withal, a big bufotenine-boner…

Given our contemporary fixation on DMT, many will be surprised by the oral activity of 5-MEO-DMT and bufotenine. They oughtn't be—in this respect, DMT is the *exception*, not the rule, among tryptamines (of some 30 simple tryptamines reported psychoactive by Shulgin & Shulgin [1997], 28 are so orally, the other exception not having been tried thus). We know that N,N-dipropyltryptamine [DPT; PHARMACOTHEON NO. 10; TIHKAL NO. 9] is active intranasally from 35–200 mg [Case 1999; Gwyllm 1999; Toad 1999]; also N-methyl-N-isopropyltryptamine [MIPT; TIHKAL NO. 47], 20 mg; and N,N-diethyltryptamine [DET; PHARMACOTHEON NO. 5; TIHKAL NO. 3], *circa* 100 mg [Gartz 1999]. Migraine-drug *Imitrex*® or sumatriptan [*Merck Index* 12: 9172] (5-methanesulfonamide-DMT; as succinate salt, 45.5% DMT; dosages stated as base, 64% DMT), herald of a veritable «triptan» gold-rush (= pharmaceutical «Drugspeak» [Dally 1995] for TRYPTAMINE) is active both intranasally (20 mg) and orally (50–100 mg), having minor psychoactivity—the prospectus [Cerenex 1993] lists «euphoria, intoxication, hyperesthesia» among «adverse reactions», while claiming the drug be specific to 5-HT_{1D} serotonine-receptors, 'though now known to have affinity for three other subtypes [Kebabian & Neumeyer 1994; Watts & Cohen 1999]. Since bufotenine and LSD (both Schedule I) likewise bind to 5-HT_{1D} [Callaway & McKenna 1998], sumatriptan is a «controlled-substance analogue» as both to structure *and* pharmacology. I confess I ignored contraindication of sumatriptan with MAOI, and found harmaline enhanced both oral and sublingual activity—guess I shan't be able to sue the manufacturer for my «adverse reactions», scarcely worth writing home to mother about, in any case. Mexican prices for *Imigran*® (100 mg tablets) correspond to DMT at just over $175/gram, doubtless quite competitive with occasional black-market sources.



Quararibea funebris (LA LLAVE) VISCHER [Bombacaceæ],
E.W. Smith, *cacahuaxóchitl* or *poyomatli*, flowers of
which were added to Aztec *cacáhuatl*-potions and *acáyetl* tobacco-reeds.

ARBOREAL AFFLATUS

Taíno Talking Tree

> «Dime quién eres… y qué haces aquí, y qué quieres de mí y por qué me has hecho llamar. Dime si quieres que te corte, o si quieres venir conmigo, y cómo quieres que te lleve, que yo te construiré una casa con una heredad». Entonces aquel árbol o ZEMÍ, hecho ídolo o diablo, le responde, diciéndole la forma en que quiere que lo haga. Y él lo corta, y lo hace del modo que le ha ordenado…
>
> **Ramón Pané**, *Relación acerca de las antigüedades de los indios* [1496]

Cohoba-copse, portentous sagacity susurrant, lowing limbs windwhispery animated, leafy living language luxuriant; astir, yes, aflame, aglow, dying embers of day glancing 'round the glen, lambent o'er lisping listening leaves. Leafen *logos*, listenerlonging, susurrant, shamansummoning; writhing roots, soothsighing windwhispers caressing crepuscular calm. Afrighted by *cohoba's* wriggling roots, holding hostage his homeward haste, in fearful tremulous tones, the wayfarer timidly inquires: who speaks? Susurrant sighs, wan whispers on the wind, a vatic verdant voice volleys: call me a shaman, a *buhuitihu*—he will tell you who I be. And the *buhuitihu* made haste to answer her susurrant summons, prostrating himself before the gnarled trunk of the talking tree in abandoned adoration. After a long while, he lifted his head from the ground, O, and began to intone; with calm authority the *buhuitihu* started to sing:

The wise BUHUITIHU am I, known to MÁCOCAEL,
Serpent-warrior am, fervent frog-seducer am,
Crowned by the stars, herald of the heavens,
I am he… am he, I, he who knows, am.

Wise healer am, sly snuffwise doctor am,
Mighty GÜEYO-speaking BUHUITIHU am,
Breather of COHOBA am, seeing and knowing all am,
Inspirer am, I, he who has no father, am.

BAYAMANACO am, I, of ITIBA CAHUBABA born;
The GUANGUAYO of COHOBA-snot I flung,
That sired the Cosmic Turtle of my brother's back,
COHOBA-nose am, I, all-healing GUANGUAYO-nose am.

To Coaybay soar I, soaring spirit-eagle am,
Venerable savage am, of CAHUBABA born, I know,
Know the secret, spectral worlds unseen by men, I
Fearless am, I all-seeing am, I BUHUITIHU am.

I am who knows what has been; yea, and what will be,
COHOBA-snuffer am, COHOBA-seer, aye, I soar,
GÜEYO-chewer am, GÜEYO-sigher am, I speak, aye,
Sigh the truth, I, soothsigher am, COHOBA-breath sigh I.

Sexy seductive seedman am, Cosmic Tree-lover am,
Lover of COHOBA am… COHOBA, she makes love to me, O
She penetrates, she pervades me, lofts me on her leafy wings,
Soaring o'er celestial, o'er terrestrial realms, see I all.

COHOBA-BUHUITIHU am, soothsigher am, he who snuffs,
Making COHOBA, making love with thy sensuous seed,
Humbled 'neath thy awesome arbor, so beauteous boughs,
Sirensweet COHOBA, my sultry savannah-sage, show me now, do!

BUHUITIHU am, beseeching thee, O, beloved COHOBA, thou
Beseech I do, speak to me now, show me, O, do,
Be thou not bashful my beauty, let me, O, let me see!

Shaman softly singing, sweet and seductive, urging her vatic verdant velvety voice on the anxious air, tenderly crushing *cohoba*-seeds, commingling niveous nacreous powder of *cohobo*-shellcreature, yea, pearly dust of *cohibici*-seagems gestated within the aqueous alembic of her wavewashed white watery womb. Soothsighsummoning shaman, leafylanguage listening, boughbreathbeseeching sinuously sways, crooning *caritas*, sways, hovers, singing and suddenly stops, reverently removing the timeworn *taboca* from his shaman-stash, coupling bifurcated tips to his nostrils, snorting now sonorously dancing divinatory dust, cosmicatholicon *cohoba*, gemmy, pulverulent pearly semensnuff sacramental. Snuffing, sneezing, stunned and arboreal awestricken he soars on the wind, on silent susurrant windwhispery wings, lofting leeward leafy limbs of language borne; aloft, alar, *aliunde*, alchemized alast alone, alofting upon alacritous alary of alkaloidal *algarrobo*; ambrosialight and aliform he alights on bent knee athwart her arboreal altar, alights, aglow, amaranthine, he, amazed, amatorial:

Reveal thyself to me, O fairest flower mine,
So lush and leafy, boughy beauty, thou,
Why, O why hast thou summoned me?

Be thou not bashful, my blushing, blossomy beauty,
Bless me, brave bower of bliss, BUHUITIHU me,
Bestow upon me thy most intimate charms,
Anoint me with the nepenthic niveous nectar
Of thy fragrant, fecund flower… thou,
Whose billowy blossoms, so, O sensuous seeds
Sparked and seduced me, entranced me entirely.

Bid me behold thy sexquisite secrets,
Intimate intrigues of thy enchanting embrace;
Reveal to me, O, thy most intimate charms,
Charms I might reify in radiant raiment
That other men, having neither eyes nor ears
To behold, to hear thee, men who know thee not,
May then adore thee as do I… ardently.
I shall not fail, my leafen lover, O
To honor always, cherish and protect thee,
To love thee, yes, ever love thee and do thy bidding,
Lissome leafen lover mine, I languish and long for thee!

Loose, loose thy verdant veil, show me now, do,
I beg thee, my darling, my adorable arboreal angel,
Show me thy beauty bare and O so dewbejewelled, O,
Thou nectary naked nymph, nubile, numinous, O, so sexy,
Bless me, do, with thy sexquisite charms, O, do!

Tell me who thou beest, and what thou doest here,
And what thou desireth of ME,
And why thou hast called ME.
Tell me if thou wisheth I should cut thee,
Or whether thou desireth to come with me,
And how thou wisheth I should take thee,
For I will build thee a house with an estate.

Then again he falls silent, listless, lovelorn listener, lubricous he, lavishing candent caresses allo'er her listenerlonging, leafy loins, embracing her barky bosom, inhaling piquant, pheromonal perfumes of her passion, nectarneeding, fondling her filigree of feathery foliage with fervent *finesse*. Listening, he awaits and awaiting, he listens. Then her limbs begin to low, swaying susurrant; lisping languageleafy limbs lowing and whispering ladylush language, loinlush windwhispers; mantic murmur mazing midst nectary mouths and leafen *linguæ*; treetongues tittering tentatively whispering upon the stillness, listenerlonging lyrical leafy limbs of language. Dewsilky dreamily dulcent, her verdant velvety voice whispers wanton windsong in his waiting ear:

GUABANCEX am I, sister of COHOBA, I am that;
Iracundious GUABANCEX am, yes, am she
Who sighs the wind and weeps the rain.
Mighty weaver of tempests I, so, O, tyrannous strong!
Tree-uprooter am, my raging hurricanes
Howl and havoc wreak, so houserazing, O horrific!
Windsighing rainweeping, resplendent GUABANCEX am;
Lightningbolts mine be, Caonao seed I, O,
Spawning gold in cavernous Cazibaxagua, Amayaúna, I
Birthing gold and men and CAZABE and COHOBA.
All, yea, whatsoever groweth is my offspring, I
GUABANCEX am, tyrannous strong, but tender be,
To whosoever assuages my anima, placates my puissance,
My hurricanes hostage to honor and homage I'll hold.

Take me, aye, fell me forthwith and housel me here,
Then craft me a temple on the sandy shores of Haití,
A fortress proof of my windwailing wavewanton wrath;
Where lesser men than thee may know me…
Graciously garbed in a genial guise to beguile their fear;
That they make love to me, suck my fecund feminine flower, I
GUABANCEX am, enigmatic mother of whatsoever living, dies.

Shape me soft, all sensuous splendor sexquisite,
As a languid languorous lady hew me, a loinlush lascivious lass,
All concupiscent curves and venereal vortices, yes,
To kindle desire in every man's heart, craving me all and every;

To make their loinlimbs hard, like this wooden body.
Show them the sensuous spirit 'neath my voraginous visage
That they may know my concupiscent charms. So
Fashion me for them: a fecund, fair, and fervent, flower, fine.

Confer upon me this incarnation I crave,
Nourish me ever and anon, make COHOBA-love to me
And I shall show thee secrets sempiternal surreal;
But implore me, and I shall answer thy petitions,
Hew me, then harbor me thus winsome and womanly warm,
And I shall protect thee from poisons, from perils aplenty
And thou shalt be the mightiest BUHUITIHU in all the realms!

And then her voice faded into the foliage, breathing a sensuous sigh, sweet sword of an angel queen susurrant, tendering her trenchant trunk to him, trembling at the touch of his axe, trembling, shuddering, then toppling, sighswoon of leafy boughs rushing to meet the Earth, surrendering her sinewy, sinuous body to this man she had chosen, letting him take her, ravish her, do her bidding and have his way with her, ever and anon. And ever and anon he invoked her healing grace at her seaside sanctuary, besought her mercy when tempests threatened Taíno-harvests, when the sultry, savage sea arose angrily against them, breaching her protean littoral limbus.

ZEMÍ GUABANCEX, mighty mistress mine,
Hear, O hear my plea, GUABANCEX, O,
Weaver of the wind, tailoress of tempests tyrannous strong,
Rainweeper GUABANCEX, O, hear me now!

BAYAMANACO am, I, of ITIBA CAHUBABA born;
The GUANGUAYO of COHOBA-snot I flung,
That sired the Cosmic Turtle of my brother's back,
COHOBA-nose am, I, all-healing GUANGUAYO-nose am,
Humbly make thee COHOBA-love, thy COHOBA make thee I.

Of COHOBA art thou wrought, I COHOBA inspire, I
BUHUITIHU am, I with celestial COHOBA-snot heal, I
GÜEYO speak, COHOBA sigh; I crave thy piquant passionperfume!
Visionvoice of venery, sirensexy COHOBA, O take, O love me!

Justicia pectoralis JACQ. var. *stenophylla* LEON. [Acanthaceæ], E.W. Smith, the Waiká *mashi-hiri*, both source of one visionary *epéna*-snuff, and additive to *Virola*-based *epéna*-snuffs.

In Xanadu did Kubla Khan/A stately pleasure-dome decree:/Where Alph, the sacred river, ran/ Through caverns measureless to man/Down to a sunless sea./So twice five miles of fertile ground/ With walls and towers were girdled round:/And there were gardens bright with sinuous rills/Where blossom'd many an incense-bearing tree;/And here were forests ancient as the hills,/Enfolding sunny spots of greenery.

Samuel Taylor Coleridge, *Kubla Khan* [1797]

Adams, K.K. 1990. «Prehistoric reedgrass (*Phragmites*) «cigarettes» with tobacco (*Nicotiana*) contents: A case study from Red Bow Cliff dwelling, Arizona» *Journal of Ethnobiology* 10(2): 123–139. [*vide* Reagan 1929]

Aguirre G., L.E. 1971. *The American Myristicaceæ*. Herb. Nacional, Bogotá, Colombia.

Agurell, S. *et al.* 1968. «Identification of two new β-carboline alkaloids in South American hallucinogenic plants» *Biochemical Pharmacology* 17: 2487–2488. [*vide ibid.*, 1969]

Agurell, S. *et al.* 1969. «Alkaloids in certain species of *Virola* and other South American plants of ethnopharmacologic interest» *Acta Chemica Scandinavica* 23(3): 903–916.

Alcántara, Á.A. 1987. «Cuando el tabaco llegó a Europa» Exhibit catalogue, *Culturas y Drogas*. Museo Nacional de Etnología, Madrid, España, pp. 27–30. [Brooks 1953]

Aldunate, C. *et al.* 1983. «Ethnobotany of pre-altiplanic community in the Andes of northern Chile» *Economic Botany* 37(1): 120–135.

Alvares Pereira, N. 1957. «Obtenção da bufotenina das sementes de Piptadenia peregrina Benth» *Revista Brasileira da Farmácia* 38: 139–142. [*et* Fish 1955; Giesbrecht 1960]

Alvarsson, J.-Å. 1995. «Tobacco, cebil and shamanism among the Weenhayek» *Acta Americana* 3(2): 117–136. [*vide item* Wassén 1995]

Anderson, E.F. 1986. «Ethnobotany of hill tribes of northern Thailand. II. Lahu medicinal plants» *Economic Botany* 40(4): 442–450. [Part I, *in re* Akha: 40(1): 38–53, 1986]

Andoh, A. 1991. *The Science and Romance of Selected Herbs Used in Medicine and Religious Ceremony*. North Scale Institute, San Francisco, CA. [*vide item*: Neuwinger 1996]

Andritzky, W. 1989. *Schamanismus und rituelles Heilen im alten Perú*. Verlag Clemens Zerling, Berlin, Deutschland. [II Bände]

Anon. 1988. *União do Vegetal. Hoasca: fundamentos e objetivos*. Centro de Memória e Documentação, Brasília, Brasil. [non-public]

Antonil, A.J. 1965. *Cultura e opulência do Brasil por suas drogas e minas*. Institut de Hautes Études de l'Amérique, Paris, France. [Or. 1711]

Antonil [A.R. Henman] 1978. *Mama Coca*. Hassle Free Press, London, England.

Appleton, R.E. 1988. «*Lætiporus sulphureus* causing visual hallucinations and ataxia in a child» *California Medical Association Journal* 39: 48–49. [*vide item* Edwards *et al.* 1961]

Ayensu, E.S. 1978. *Medicinal Plants of West Africa*. Reference Publicat., Algonac, MI.

Baer, G. 1992. «The one intoxicated by tobacco: Matsigenka shamanism» In: E.J. Matteson Langdon and G. Baer (Eds.) *Portals of Power: Shamanism in South America*. Univer-

sity of New México Press, Albuquerque, NM, pp. 79–100. [Baer 1995; Wilbert 1987]

Baer, G. 1995. «The role of tobacco in the shamanism of the Matsigenka, eastern Perú» *Acta Americana* 3(2): 101–116. [Baer 1992]

Balée, W. 1989. «Nomenclatural patterns in Ka'apor ethnobotany» *Journal of Ethnobiology* 9(1): 1–24. [*vide item*: Balée 1994]

Balée, W. 1994. *Footprints of the Forest: Ka'apor Ethnobotany–The Historical Ecology of Plant Utilization by an Amazonian People.* Columbia University Press, New York, NY.

Bancroft, E. 1769. *An Essay on the Natural History of Guiana in South America.* Bracket & de Hondt, London, England.

Barneby, R.C. 1995. «Sensitivæ censitæ: A description of the genus *Mimosa* Linnæus (Mimosaceæ) in the New World» *Memoirs of the New York Botanical Garden* 65: 1–835.

Bastien, J.W. 1983. «Pharmacopeia of Qollahuaya Andeans» *Journal of Ethnopharmacology* 8(1): 97–111. [*et* Oblitas Poblete 1992]

Bean, L.J. and **K.S. Saubel** 1972. *Temalpakh: Cahuilla Indian Knowledge and Usage of Plants.* Malki Museum Press, Banning, CA.

Becher, H. 1960. «Die Surará und Pakidái, zwei Yanoámi-Stämme in Nordwestbrasilien» *Mitteilung aus dem Museum für Völkerkunde in Hamburg*, XXVI. Deutschland.

Bennett, B.C. 1992. «Hallucinogenic plants of the Shuar and related Indian groups in Amazonian Ecuador and Perú» *Brittonia* 44: 483–493. [*vide* Bennett & Alarcón 1994]

Bennett, B.C. and **R. Alarcón** 1994. «*Osteophlœum platyspermum* and *Virola duckei* (Myristicaceæ): Newly reported as hallucinogens from Amazonian Ecuador» *Economic Botany* 48(2): 152–158. [Bennett 1992]

Bernauer, K. 1964. «Notiz über die Isolierung von Harmin und (+)1,2,3,4-Tetrahydro-harmin aus einer indianischen Schnupfdroge» *Helvetica Chimica Acta* 47(4): 1075–1077.

Bertoni, M.S. 1927. *La civilización guaraní. Parte* III. Pto. Bertoni, Alto Paraná, Paraguay.

Bianchi, A. and **G. Samorini** 1993. «Plants in association with ayahuasca» *Jahrbuch für Ethnomedizin und Bewußtseinsforschung* 2: 21–42. [*et* McKenna *et al.* 1995; Ott 1999B]

Biocca, E.F. 1965. *Viaggi tragli Indi–Alto Río Negro–Alto Orinoco.* Consiglio Nazionale delle Richerche, Roma, Italia. [*ibid.* 1996]

Biocca, E.F. 1996. *Yanoáma: The Story of Helena Valero, a Girl Kidnapped by Amazonian Indians.* Kodansha, New York, NY. [Or. 1965]

Biocca, E.F. *et al.* 1964. «Sulla sostanze allucinogene impiegata in Amazzonia. Nota I. Osservazioni sul paricá dei Tukâno e Tariâna del bacino del Río Uaupés» *Annali di Chimica* 54: 1175–1178. [Marini-Bettòlo 1964]

Birk, G. 1995. *Plantas útiles en bosques y pampas chiquitanas.* APCOB, Santa Cruz, Bolivia.

Bisset, N.G. 1992. «War and hunting poisons of the New World. Part I. Notes on the early history of curare» *Journal of Ethnopharmacology* 36(1): 1–26. [*et*: 36(1): 43–50, 1992]

Blanchette, R.A. *et al.* 1992. «Nineteenth century shaman grave guardians are carved *Fomitopsis officinalis* sporophores» *Mycologia* 84(1): 119–124. [*vide item*: Rätsch 1998A]

Bonhour, A. *et al.* 1967. «Estudios psicofarmacológicos con bufotenina» *Revista de Psiquiatría y Psicología Médica* 8(3): 123–143.

Boom, B.M. and **S. Moestl** 1990. «Ethnobotanical notes of José M. Cruxent from the Franco–Venezuelan expedition to the headwaters of the Orinoco River, 1951–1952» *Economic Botany* 44(3): 416–419. [Koch-G.]

Boulos, L. 1983. *Medicinal Plants of North Africa.* Reference Publications, Algonac, MI.

Braunstein, J. 1997. «El chamán y el espacio religioso de la «misa» de los matacos [*sic*]» In: J. Schobinger (Ed.) *Shamanismo* [*sic*] *sudamericano.* Editorial Almagesto, Buenos Aires, Argentina, pp. 69–86. [*et* Dasso 1985]

Brekhman, I.I. and **Y.A. Sam** 1967. «Ethnopharmacological investigation of some psychoactive drugs used by Siberian and far-eastern minor nationalities of U.S.S.R.» In: D.H. Efron *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs.* US Government Print. Off., Washington, DC, p. 415.

Brewer-Carias, C. and **J.A. Steyermark** 1976. «Hallucinogenic snuff drugs of the Yanomamo Caburiwe-Teri in the Cauaburi River, Brazil» *Economic Botany* 30(1): 57–66.

Brooks, J.E. 1953. *The Mighty Leaf: Tobacco Through the Centuries.* Alvin Redman, Ltd., London, England. [*vide*: Goodman 1993]

Bruhn, J.G. *et al.* 1976. «The tomb from Niño Korín: Identification of nicotine in a Bolivian archæological collection» *Göteborgs Etnografiska Museet Årstryck* 1976: 45–48.

Buchillet, D. 1992. «Nobody is there to hear: Desana therapeutic incantations» In: E.J. Matteson Langdon and G. Baer [Eds.] *Portals of Power: Shamanism in South America.* University of New México Press, Albuquerque, NM, pp. 211–230. [*vide item*: Hill 1992]

Burger, R.L. 1992. *Chavín and the Origins of Andean Civilization.* Thames & Hudson, London, England. [Reprint edition in 1995]

Calderón, E. *et al.* 1982. *Eduardo el Curandero: The Words of a Peruvian Healer.* North Atlantic Books, Richmond, CA. [Sharon 1979]

Calella, P.P. de 1945. «Tabaco en las tribus siona» *Amazonia Colombiana Americanista* 3(9-10): 39. [*et* Schultes 1945; Wilbert 1987]

Califano, M. 1975. «El chamanismo mataco [*sic*]» *Scripta Ethnologica* 3(2): 7–60. [Dasso]

Callaway, J.C. and **D.J. McKenna** 1998. «Neurochemistry of psychedelic drugs» In: S.B. Karch [Ed.] *Drug Abuse* [*sic*] *Handbook.* CRC Press, Inc., Boca Ratón, FL, pp. 485–498.

Candre, H. 1996. *Cool Tobacco, Sweet Coca: Teachings of an Indian Sage from the Colombian Amazon.* Translated by J.A. Echeverri. Themis Books, Totnes, Devon, England.

Cárdenas, Juan de 1988. *Problemas y secretos maravillosos de las Índias.* Alianza Editorial, Madrid, España. [Original edition in 1592]

Carneiro, R.L. 1974. «Hunting and hunting magic among the Amahuaca of the Peruvian montaña» In: P.J. Lyon [Ed.] *Native South Americans: Ethnology of the Least Known Continent.* Little, Brown & Co., Boston, MA, pp. 122–132. [*et Ethnology* 3: 331–341, 1964]

Carter, W.E. and **M. Mamani P.** 1986. *Coca en Bolivia.* Ed. «Juventud», La Paz, Bolivia.

Case, J. 1999. «DPT: *Mysterium tremendum*» *The Entheogen Review* 8(2): 56. [Toad 1999]

Cassady, J.M. *et al.* 1970. «The isolation of 6-methoxytetrahydroharman from Virola cuspidata and N-monomethyltryptamine from Virola theiodora» In: K. Mothes *et al.* [Eds.] *Internationale Symposium: Biochemie und Physiologie der Alkaloide.* Akademie Verlag, Berlin, Deutschland, pp. 95–99.

Cassady, J.M. *et al.* 1971. «The isolation of 6-methoxyharmalan and 6-methoxyharman from *Virola cuspidata*» *Lloydia* 34(1): 161–162. [extension of Cassady *et al.* 1970]

Castillo, J. 1997. «Piaroa» In: J.M. Poveda [Ed.] *Chamanismo: El arte natural* [*sic*] *de curar.* Temas de Hoy, Madrid, España, pp. 357–362. [*vide*: Ott 1995C; Rätsch 1996A]

Castner, J.L. *et al.* 1998. *A Field Guide to Medicinal and Useful Plants of the Upper Amazon.* Feline Press, Gainesville, FL. [Duke 1994]

Cerenex Pharmaceuticals 1993. «Imitrex™ (sumatriptan succinate) Injection» Product Information 4043197, Research Triangle Park, NC. [*vide*: Watts & Cohen 1999]

Chagnon, N.A. 1968. *Yanomamö: The Fierce People.* Holt, Rinehart and Winston, New York, NY. [first edition of Chagnon 1992]

Chagnon, N.A. 1992. *Yanomamö: The Last Days of Eden.* Harcourt, Brace Jovanovich Publishers, San Diego, CA. [Chagnon 1968]

Chagnon, N.A. *et al.* 1970. «Algunos aspectos de uso de drogas, comercio y domesticación de plantas entre los indígenas yanomamö de Venezuela y Brasil» *Acta Científica Venezolana* 21: 186–193. [*ibid.*, 1971]

Chagnon, N.A. *et al.* 1971. «Yanomamö hallucinogens: Anthropological, botanical, and chemical findings» *Current Anthropo-*

logy 12(1): 72–74. [*et* Chagnon *et al.* 1970]
Cobo, B. 1956. *Historia del Nuevo Mundo.* Biblioteca de Autores Españoles, Tomos 91–92. Atlas, Madrid, España. [Original 1653]
Coe, F.G. and **G.J. Anderson** 1997. «Ethnobotany of the Miskitu of eastern Nicaragua» *Journal of Ethnobiology* 17(2): 171–214.
Conrad III, B. 1988. *Absinthe: History in a Bottle.* Chronicle Books, San Francisco, CA.
Cooke, M.C. 1860. *The Seven Sisters of Sleep. Popular History of the Seven Prevailing Narcotics of the World.* J. Blackwood, London, England. Facsimile reprint-edition in 1989 by Quarterman Publications, Lincoln, MA.
Coppens, W. and **J. Cato-David** 1971. «Aspectos etnográficos y farmacológicos el [*sic*] yopo entre los cuiva-guajibo» *Antropologica* 28: 3–24. [*vide*: Castillo 1997; Spruce 1908]
Cordy-Collins, A. 1982. «Psychoactive painted Peruvian plants: The shamanism textile» *Journal of Ethnobiology* 2(2): 144–155.
Corothie, E. and **T. Nakano** 1969. «Constituents of the bark of *Virola sebifera*» *Planta Medica* 17(2): 184–188. [*et* Kawanishi 1985]
Costa, C. *et al.* 1992. «Indole alkaloids from the roots of an African plant *Securidaca longipedunculata.* I. Isolation by column chromatography and preliminary structural characterization by mass spectrometry» *Journal of Heterocyclic Chemistry* 29: 1641–1647.
Costantini, E.A. 1975. «El uso de alucinógenos de orígen vegetal por las tribus indígenas del Paraguay actual» *Cuadernos Científicos* CEMEF 4: 35–48. [*vide item*: Bertoni 1927]
Dally, A. 1995. «Anomalies and mysteries in the «war on drugs»» In: R. Porter and M. Teich [Eds.] *Drugs and Narcotics in History.* Cambridge University Press, Cambridge, England, pp. 199–215. [*vide item* Ott 1995B]
Da Mota, C.N. 1987. *As Jurema Told Us: Kariri-Shoko and Shoko Mode of Utilization of Medicinal Plants in the Context of Modern Northeastern Brazil.* Univ. of Texas, Austin.
Da Mota, C.N. 1997. *Jurema's Children in the Forest of Spirits.* Intermediate Technology Publications, London, England. [*ibid.* 1987]
Da Mota, C.N. and **J.F.P. de Barros** 1990. «Jurema: Black-indigenous drama and representation» In: D.A. Posey and W. Overall [Eds.] *Ethnobiology: Implications and Applications.* Museu Paraense Emílio Goeldi, Belém, Pará, Brasil, Vol. 2, pp. 171–180.
Dasso, M.C. 1985. «El shamanismo [*sic*] de los mataco [*sic*] de la margen derecha del río Bermejo (Provincia del Chaco, República Argentina)» *Scripta Ethnologica* 5: 9–35.
Davis, E.W. 1983. «The ethnobotany of chamairo: *Mussatia hyacinthina*» *Journal of Ethnopharmacology* 9(2,3): 225–236. [Plowm.]
Davis, E.W. 1988. *Passage of Darkness: The Ethnobiology of the Haitian Zombie.* University of North Carolina Press, Chapel Hill, NC. [*J. Ethnopharm.* 9(1): 85–104, 1983]
Davis, E.W. 1996. *One River: Explorations and Discoveries in the Amazon Rain Forest.* Simon & Schuster, New York, NY. [biogr.]
Davis, E.W. and **A.T. Weil** 1992. «Identity of a New World psychoactive toad» *Ancient Mesoamerica* 3: 51–59. [*et* Weil & Davis 1994]
Davis, E.W. and **J.A. Yost** 1983. «The ethnobotany of the Waorani of eastern Ecuador» *Botanical Museum Leaflets* Harvard University 29(3): 159–218. [*J. Ethnoph.* 9: 273, 1983]
De Almeida Costa, O. 1970. «Farmaco-etnología do paricá e do yákee» *Revista Brasileira da Farmácia* 51: 273–299. [Schult. 1954]
Dean, W. and **J. Morgenthaler** 1990. *Smart Drugs and Nutrients.* Health Freedom Publications, Menlo Park, CA. [Vol. 1 of series]
De Budowski, J. *et al.* 1974. «On the alkaloid composition of the snuff drug yopo from the upper Orinoco (Venezuela)» *Il Farmaco (Edizione Scientifica)* 29(8): 574–578.
De Carvalho, J.E. and **A.J. Lapa** 1990. «Pharmacology of an Indian-snuff obtained from Amazonian *Maquira sclerophylla*» *Journal of Ethnopharmacology* 30(1): 43–54. [1997]
De Carvalho, J.E. *et al.* 1997. «Pharmacological properties and identification of cardiotoxic principles from the Indian snuff, *Maquira sclerophylla* Ducke» *Phytotherapy Research* 11: 136–141. [*vide* De Carvalho 1990]
De Civrieux, M. 1980. *Watunna: An Orinoco Creation Myth.* Trans. D.M. Guss. North Point Press, San Francisco, CA. [Ori. 1970]
De la Condamine, M. 1749. «Relation abrégée d'un voyage fait dans l'intérieur de l'Amérique méridionale...» *Mémoirs de l'Académie Royale des Sciences,* Anné 1745: 48 *et seq.*
De la Garza, M. 1990. *Sueño y alucinación en el mundo náhuatl y maya.* Univer. Nacional Autónoma de México, México, DF.
De Lincourt, M. 1854. In: H. Schleiffer [Ed.] 1973. *Sacred Narcotic Plants of the New World Indians.* Hafner, New York, NY, pp. 84–85.
De Lucca D., M. and **J. Zalles A.** 1992. *Flora medicinal boliviana: Diccionario enciclopédico.* Los Amigos del Libro, La Paz, Bolivia.
Densmore, F. 1974. *How Indians Use Wild Plants for Food, Medicine and Crafts.* Dover Publications, New York, NY. [Morgan 1980]
De Ovalle, A. 1888. *Historia del reyno de Chile...* Tomo I. Colección de Historiadores de Chile, Santiago, Chile. [von Reis Alt. 1972]
Desmarchelier, C. *et al.* 1996. «Ritual and medicinal plants of the Ese'ejas of the Amazonian rainforest (Madre de Dios, Perú)» *Journal of Ethnopharmacology* 52(1): 45–51.
Desmarchelier, C. *et al.* 1999. «Antioxidant and free radical scavenging activities in extracts from medicinal trees used in the «Caatinga» region in northeastern Brazil» *Journal of Ethnopharmacology* 67(1): 69–77.
De Smet, P.A.G.M. 1983. «A multidisciplinary overview of intoxicating enema rituals in the western hemisphere» *Journal of Ethnopharmacology* 9(2,3): 129–166. [*et* 1985B]
De Smet, P.A.G.M. 1985A. *Ritual Enemas and Snuffs in the Americas.* CEDLA, Amsterdam, Nederland. [*Latin American Studies* NO. 33]
De Smet, P.A.G.M. 1985B. «A multidisciplinary overview of intoxicating snuff rituals in the western hemisphere» *Journal of Ethnopharmacology* 13(1): 3–49. [*et* 1983, 1985A]
De Smet, P.A.G.M. 1998. «Traditional pharmacology and medicine in Africa: Ethnopharmacological themes in sub-Saharan art objects and utensils» *Journal of Ethnopharmacology* 63(1,2): 1–179. [Neuwinger 1996]
De Smet, P.A.G.M. and **F.J. Lipp, Jr.** 1987. «Supplementary data on ritual enemas and snuffs in the western hemisphere» *Journal of Ethnopharmacology* 19(3): 327–331. [1983]
De Smet, P.A.G.M. and **L. Rivier** 1985. «Intoxicating snuffs of the Venezuelan Piaroa Indians» *Journal of Psychoactive Drugs* 17 (2): 93–103. [*vide*: De Smet & Rivier 1987]
De Smet, P.A.G.M. and **L. Rivier** 1987. «Intoxicating paricá seeds of the Brasilian Maué Indians» *Economic Botany* 41(1): 12–16.
DeWalt, S.J. *et al.* 1999. «Ethnobotany of the Tacana: Quantitative inventories of two permanent plots of northwestern Bolivia» *Economic Botany* 53(3): 237–260.
Díaz, J.L. 1979. «Ethnopharmacology and taxonomy of Mexican psychodysleptic [*sic*] plants» *Journal of Psychedelic Drugs* 11 (1-2): 71–101. [*Cuad. Cien.* CEMEF 4: 195, 1975]
Dijour, E. 1933. «Les cerémonies d'expulsion des malades chez les Mataco [*sic*]» *Journal de la Société des Américanistes* 25: 211–217.
Dobkin de Ríos, M. and **M. Cárdenas** 1980. «Plant hallucinogens, shamanism and Nazca ceramics» *Journal of Ethnopharmacology* 2(3): 233–246. [*et* Furst 1974; Reid 1986]
Dobritzhoffer, M. 1822. *An Account of the Abipones, an Equestrian People of Paraguay.* John Murray, London, England.
Donner, F. 1982. *Shabono.* Dell Publishing Co., Inc., New York, NY. [popular novel]
Ducke, A. 1938. «Plantes nouvelles...» *Arquivos do Instituto da Biologia Vegetal* 4(1): 3.
Ducke, A. 1939. *As leguminosas da Amazônia brasileira.* Servicio da Publicidade Agrícola, Rio de Janeiro, Brasil. [*et* Ducke 1938]
Duke, J.A. 1985. CRC *Handbook of Medicinal*

Herbs. CRC Press, Incorp., Boca Ratón, FL.
Duke, J.A. 1987. *Isthmian Ethnobotanical Dictionary*. Privately published, Fulton, MD.
Duke, J.A. and **R. Vásquez** 1994. *Amazonian Ethnobotanical Dictionary*. CRC Press, Boca Ratón, FL. [Castner 1998; Duke 1985,1987]
Edwards, R.L. *et al.* 1961. «Constituents of the higher fungi. Part I. Hispidin, a new 4-hydroxy-6-styryl-2-pyrone from *Polyporus hispidus* (Bull.) Fr.» *Journal of the Chemical Society* 1961: 4995. [*vide*: Ueno *et al.* 1964]
Fabing, H.D. and **J.R. Hawkins** 1956. «Intravenous bufotenine injection in the human being» *Science* 123: 886–887. [Turner 1959]
Farabee, W.C. 1922. «Indian tribes of eastern Perú» *Papers of the Peabody Museum of Archæology and Ethnology*, Paper 10: 1–194.
Fellows, L.E. and **E.A. Bell** 1971. «Indole metabolism in *Piptadenia peregrina*» *Phytochemistry* 10: 2083–2091. [Schultes *et al.* 1977B]
Fericgla, J.M. 1994. *Els jívaros* [*sic*], *caçadors de somnis*. Edicions la Campana, Barcelona, España. [Castillian 1994. Integral, Barcelona. Italian 1998. Xenia Edizioni, Milano]
Fernández Distel, A.A. 1980. «Hallazgo de pipas en complejos precerámicos del borde de la Puna de Jujuy (República Argentina) y empleo de alucinógenos por parte de las mismas culturas» *Estudios Arqueológicos* 5: 55–79.
Fish, M.S. and **E.C. Horning** 1956. «Studies on hallucinogenic snuffs» *The Journal of Nervous and Mental Disease* 124(1): 33–37.
Fish, M.S. *et al.* 1955. «Piptadenia alkaloids. Indole bases of *P. peregrina* (L.) Benth. and related species» *Journal of the American Chemical Society* 77: 5892–5895. [*vide ibid.* 1956]
Fish, M.S. *et al.* 1956. «*t*-Amine oxide rearrangement. N,N-Dimethyltryptamine oxide» *Journal of the American Chemical Society* 78: 3668–3671. [*vide item*: *ibid.*, 1955,1956]
Furst, P.T. 1974. «Archæological evidence for snuffing in prehispanic México» *Botanical Museum Leaflets* Harvard University 24(1): 1–28. [*vide item*: Wassén 1965,1995]
Furst, P.T. 1996. «Shamanism, transformation, and Olmec art» In: J. Guthrie (Ed.) *The Olmec World: Ritual and Rulership*. The Art Museum, Princeton University, Princeton, NJ, pp. 69–81. [*vide item*: Wassén 1965,1995]
Galeffi, C. *et al.* 1983. «N,N-Dimethyl-5-methoxytryptamine, a component of a dart poison of the Yanoáma Indians» *Journal of Natural Products* 46(4): 586–587.
Gartz, J. 1999. Personal communication at ECBS Conference, Nov. 12, Basel, Schweiz.
Gates, B. 1982. «A monograph of Banisteriopsis and Diplopterys, Malpighiaceae» *Flora Neotropica* [Monograph NO. 30]. The New York Botanical Garden, Bronx, NY.
Ghazanfar, S. 1994. *Handbook of Arabian Medicinal Plants*. CRC Press, Boca Ratón, FL.
Giesbrecht, M. 1960. «Sôbre a ocorrência de bufotenina em semente de *Piptadenia falcata*, Benth.» *Anais da Associação Brasileira da Química* 19: 117–119. [Schu. 1977B]
Gilmore, M.R. 1919. *Uses of Plants by the Indians of the Missouri River Region*. Thirty-third Annual Report of the Bureau of American Ethnology. US Government Printing Office, Washington, DC. [Reprint 1991, Univers. of Nebraska Press, Lincoln, NB].
Glass-Coffin, B. 1998. *The Gift of Life: Female Spirituality and Healing in Northern Perú*. University of New México Press, Albuquerque, NM. [Joralemon & Sharon 1993]
Goldman, I. 1963. *The Cubeo: Indians of the Northwest Amazon*. Univ. Illinois, Urbana.
González B., A. [Ed.] 1988. *La expedición botánica al virreinato del Perú* (1777–1778). Real Jardín Botánica, Madrid, España.
Goodman, J. 1993. *Tobacco in History: The Cultures of Dependence*. Routledge, London, England. [Brooks 1953; Wilbert 1987]
Goodspeed, T.H. 1954. *The Genus Nicotiana: Origins, Relationships, and Evolution of its Species in the Light of their Distribution, Morphology, and Cytogenetics. Chronica Botanica* 16(1-6) Chron. Botanica, Waltham, MA.

Gorman, P. 1990. «People of the jaguar: Shamanic hunting practices of the Matses» *Shaman's Drum*, Fall, pp. 40–49. [*ibid.*, 1993]
Gorman, P. 1993. «Sciamanesimo tra i Matses» *Altrove* 1: 47–62. [*vide*: Gorman 1990]
Gottlieb, O.R. 1979. «Chemical studies on medicinal Myristicaceæ from Amazonia» *Journal of Ethnopharmacology* 1(4): 309–323.
Gragson, T.L. 1997. «The use of underground plant-organs and its relation to habitat selection among the Pumé Indians of Venezuela» *Economic Botany* 51(4): 377–384.
Granier-Doyeux, M. 1965. «Native hallucinogenic drugs piptadenias» *Bulletin on Narcotics* 17(2): 29–38. [*et* Pagés Larraya 1959]
Grether, R. 1988. «Nota sobre la identidad del tepescohuite en México» *Boletín de la Sociedad Botánica de México* 48: 151–152.
Grina, J.A. *et al.* 1982. «Old and new alkaloids from *Zanthoxylum arborescens*» *Journal of Organic Chemistry* 47(13): 2648–2651.
Grossa, D. *et al.* 1975. «New observations on the alkaloid composition of hallucinogenic snuff drugs yopo and epéna» *Atti Accademia Nazionale Lincei* 58(2): 605–607.
Gumilla, J. 1741. *El Orinoco ilustrado y defendido*.... M. Fernández, Madrid, España.
Guzmán, G. *et al.* 1975. «Una iglesia dedicada al culto de un hongo, «Nuestro Señor del Honguito», en Chignahuapan, Puebla» *Boletín de la Sociedad Mexicana de Micología* 9: 137–147. [*vide*: Blanchette *et al.* 1992]
Gwyllm 1999. «DPT: A rough time» *The Entheogen Review* 8(2): 55. [Case, Toad 1999]
Hambly, W.D. 1930. «Use of tobacco in Africa» Anthropology Leaflet 29, Field Museum of Natural History, Chicago, IL, pp. 178–200. [*vide* De Smet 1998; Linton 1930]
Hargreaves, B.J. 1986. «Plant-induced «spirit possession» in Malawi» *The Society of Malawi Journal* 39: 26–35. [*et* Samorini 1996]
Harrington, J.P. 1932. *Tobacco among the Karuk Indians of California*. Bureau of American Ethnology Bulletin 94, Smithsonian Institution, Washington, DC. [Hartwich]
Hartwich, C. 1911. *Die menschlichen Genußmittel: Ihre Herkunft, Verbreitung, Geschichte, Anwendung, Bestandteile und Wirkung*. C.H. Tauchnitz, Leipzig, Deutschland.
Hernández, F. 1942. *Historia de las plantas de Nueva España*. Imprenta Universitaria, México, DF. [Original written in Latin, 1651]
Hill, J.D. 1992. «A musical æsthetic of ritual curing in the northwest Amazon» In: E.J. Matteson Langdon and G. Baer [Eds.] *Portals of Power: Shamanism in South America*. University of New México Press, Albuquerque, NM, pp. 175–210. [*vide* Buchillet 1992]
Hofmann, A. 1963. «Psychotomimetic substances» *Indian Journal of Pharmacy* 25: 245–256; convers., Basel, November 1999.
Hohenthal, W. 1950. «Notes on the Shucurú Indians of Serra de Ararobá, Pernambuco, Brasil» *Revista do Museu Paulista* 8: 93–166.
Holmstedt, B.R. 1965. «Tryptamine derivatives in epená: An intoxicating snuff used by some South American Indian tribes» *Archives Internationales de Pharmacodynamie et de Thérapie* 156(2): 285–305. [*ibid.*, 1967]
Holmstedt, B.R. and **J.-E. Lindgren** 1967. «Chemical constituents and pharmacology of South American snuffs» In: D.H. Efron *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs*. US Government Printing Office, Washington, DC, pp. 339–373.
Holmstedt, B.R. and **J.-E. Lindgren** 1972. «Alkaloid analyses of botanical material more than a thousand years old» *Göteborgs Etnografiska Museet Etnologiska Studier* 32: 139–144. [*vide*: Bruhn *et al.* 1976; Wassén 1972]
Holmstedt, B.R. *et al.* 1980. «Indole alkaloids in Amazonian Myristicaceae: Field and laboratory research» *Botanical Museum Leaflets* Harvard University 28(3): 215–234.
Hunziker, A.T. 1973. «El «cebil» (Anadenanthera colubrina var. cebil) en la Provincia de Córdoba» *Kurtziana* 7: 265. [Argent.]
Hutchings, A. and **J. von Staden** 1994. «Plants

used for stress-related ailments in traditional Zulu, Xhosa and Sotho medicine. Part I: Plants used for headaches» *Journal of Ethnopharmacology* 43(2): 89–124. [Jäger 1996]

Iacobucci, G.A. and **E.A. Rúveda** 1964. «Bases derived from tryptamine in Argentine *Piptadenia* species» *Phytochemistry* 3: 465–467.

Illius, B. 1992. «The concept of nihue among the Shipibo-Conibo of eastern Perú» In: E.J. Matteson Langdon and G. Baer (Eds.) *Portals of Power: Shamanism in South America*. University of New México Press, Albuquerque, NM, pp. 63–77. [*vide*: Luna 1986]

Inhale Therapeutic Systems 1999. Employment-solicitation advert. *Science* 286: 2383.

Jäger, A.K. *et al.* 1996. «Screening of Zulu medicinal plants for prostaglandin-synthesis inhibitors» *Journal of Ethnopharmacology* 52(2): 95–110. [*vide*: Hutchings 1994]

Joralemon, D. and **D. Sharon** 1993. *Sorcery and Shamanism: Curing and Clients in Northern Perú*. University of Utah Press, Salt Lake City, UT. [*vide*: Glass-Coffin 1998]

Jossang, A. *et al.* 1991. «Horsfiline, an oxindole alkaloid from *Horsfieldia superba*» *Journal of Organic Chemistry* 56(23): 6527–6530.

Kamen-Kaye, D. 1971. «Chimó: An unusual form of tobacco in Venezuela» *Botanical Museum Leaflets* Harvard University 23(1): 1–59. [a fuller version: Kamen-Kaye 1975]

Kamen-Kaye, D. 1975. «Chimó–why not? A primitive form of tobacco still in use in Venezuela» *Economic Botany* 29(1): 47–68.

Karsten, R. 1920. «Beiträge zur Sittengeschichte der südamerikanischen Indianer. II. Berauschende und narkotische Getränke unter den Indianern südamerikas» *Acta Academiæ Aboensis, Humaniora* 1(4): 28–72.

Karsten, R. 1935. *The Head-Hunters of the Western Amazonas: The Life and Culture of the Jíbaro* [*sic*] *Indians of Eastern Ecuador and Perú*. Helsingfors, Suomi. [Helsinki, Finland]

Karsten, R. 1964. *Studies in the Religion of the South-American Indians East of the Andes*. Societas Scientiarum Fennica, Helsingfors, Suomi [Helsinki, Finland; *vide* 1920].

Kawanishi, K. *et al.* 1985. «Alkaloids from the hallucinogenic plant *Virola sebifera*» *Phytochemistry* 24(6): 1373–1375. [Corothie 1969]

Kebabian, J.W. and **J.L. Neumeyer** [Eds.] 1994. *The* RBI *Handbook of Receptor Classification*. Research Biochemicals International, Natick, MA. [*vide*: Watts & Cohen 1999]

Keewaydinoquay 1998. *Puhpohwee for the People: A Narrative Account of Some Uses of Fungi among the Ahnishinaubeg*. LEPS Press, Northern Illinois University, DeKalb, IL.

Kern, J.R. and **J.H. Cardellina II** 1983. «Native American medicinal plants. Anemonin from the horse stimulant *Clematis hirsutissima*» *Journal of Ethnopharmacology* 8(1): 121–123. [*vide item*: Morgan 1981]

Koch-Grünberg, T. 1909–1910. *Zwei Jahre unter den Indianern. Reisen in Nordwest-Brasilien 1903/1905*. Two volumes. Ernst Wasmuth, Berlin, Deutschland. [*et ibid.* 1923]

Koch-Grünberg, T. 1923. *Vom Roroima zum Orinoco*. Vol. 3. Verlag Strecker und Schröder, Stuttgart, Deutschland. [*ibid.*, 1909]

Lai, A. *et al.* 1973. «Phytochemical investigation of *Virola peruviana*, a new hallucinogenic plant» *Journal of Pharmaceutical Sciences* 62(9): 1561–1563. [Holmstedt 1980]

Langdon, E.J. 1986. «Las clasificaciones del yajé dentro del grupo siona: Etnobotánica, etnoquímica e historia» *América Indígena* 46(1): 101–116. [Vickers & Plowman 1984]

Larrain Barros, H. 1976. «La vilca o paricá (Anadenanthera spp.): ¿Purga o estimulante indígena?—Algunas referencias etnohistóricas» *Revista del Instituto Otavaleño de Antropología* 2(3): 27–49. [*et* Pérez 1994]

Las Casas, B. de 1909. *Apologética historia de las Índias*. I., M. Serrano y Sanz, Madrid, España. [Original *circa* 1550; *et* Pané 1974]

Lazos Chavero, E. and **M.E. Álvarez-Buylla R.** 1988. «Ethnobotany in a tropical-humid region: The home gardens of Balzapote, Veracruz» *Journal of Ethnobiology* 8(1): 45–79.

Lee, M.A. and **B. Shlain** 1992. *Acid Dreams: The Complete Social History of* LSD: *The* CIA, *the Sixties, and Beyond*. Grove Weidenfeld, New York, NY. [Original 1985; Marks 1979]

Lee, T.M. *et al.* 1975. «Screening for N-methylated tyramines in some higher fungi» *Lloydia* 38(5): 450–452. [*et* Ueno *et al.* 1964]

Legler, G. and **R. Tschesche** 1963. «Die Isolierung von N-Methyltryptamin, 5-Methoxy-N-methyltryptamin und 5-Methoxy-N,N-dimethyltryptamin aus der Rinde von Piptadenia peregrina Benth.» *Die Naturwißenschaften* 50: 94–95. [Schultes 1977B]

Li, H.-L. 1978. «Hallucinogenic plants in Chinese herbals» *Journal of Psychedelic Drugs* 10(1): 17–26 [reprinted in: *Botanical Museum Leaflets* Harvard University 25(6): 161–181].

Linton, R. 1930. «Use of tobacco in Madagascar» Anthropology Leaflet 29, Field Museum of Natural History, Chicago, IL, pp. 201–205. [*vide* Hambly 1930; Wilbert 1987]

Lipp, Jr., F.J. 1991. *The Mixe of Oaxaca: Religion, Ritual and Healing*. University of Texas Press, Austin, TX. [*vide item*: Neher 1965]

Lipp, Jr., F.J. 1995. «Ethnobotanical method and fact: A case study» In: R.E. Schultes and S. von Reis (Eds.) *Ethnobotany: Evolution of a Discipline*. Dioscorides Press, Portland, OR, pp. 52–59. [Schmeda-Hirschm. 1993]

Lizot, J. 1985. *Tales of the Yanomami: Daily Life in the Venezuelan Forest*. Cambridge University Press, Paris, France. [Chagnon 1992]

Lockwood, T.E. 1979. «The ethnobotany of *Brugmansia*» *Journal of Ethnopharmacology* 1(2): 147–164. [BMLHU 23(6): 273, 1973]

Lopes, N.P. *et al.* 1999. «Antimalarial use of volatile oil from leaves of *Virola surinamensis* (Rol.) Warb. by Waiãpi Amazon Indians» *Journal of Ethnopharmacology* 67(3): 313–319.

Lowie, R.H. 1919. «The tobacco society of the Crow Indians» *Anthropological Papers of the American Museum of Natural History* 21(2): 101–200. [AMS Press, NY, 1975 repr.]

Lozano, P. 1941. *Descripción corográfica del Gran Chaco Gualamba*. Universidad Nacional de Tucumán, Argentina. [Orig. 1733]

Luna, L.E. 1984. «The concept of plants as teachers among four mestizo shamans of Iquitos, northeastern Perú» *Journal of Ethnopharmacology* 11(2): 135–156. [11(2): 123]

Luna, L.E. 1986. *Vegetalismo: Shamanism among the Mestizo Population of the Peruvian Amazon*. [Acta Universitatis Stockholmensis, Stockholm Studies in Comparative Religion NO. 27] Almqvist and Wiksell International, Stockholm, Sverige [Sweden].

Luna, L.E. 1992. «Icaros: Magic melodies among the mestizo shamans of the Peruvian Amazon» In: E.J. Matteson Langdon and G. Baer (Eds.) *Portals of Power: Shamanism in South America*. University of New México Press, Albuquerque, NM, pp. 231–253.

Luna, L.E. and **P. Amaringo** 1991. *Ayahuasca Visions: The Religious Iconography of a Peruvian Shaman*. North Atlantic Books, Berkeley, CA. [*vide ibid*: Luna 1984,1986,1992]

Lyttle, T. *et al.* 1996. «Bufo toads and bufotenine: Fact and fiction surrounding an alleged psychedelic [*sic*]» *Journal of Psychoactive Drugs* 28(3): 267–290. [BUFOBONER]

McKeever-Furst, J.L. 1995. *The Natural History of the Soul in Ancient México*. Yale University Press, New Haven, CT. [Ortíz 1990]

McKenna, D.J. *et al.* 1984A. «Monoamine oxidase inhibitors in South American hallucinogenic plants: Tryptamine and β-carboline constituents of *ayahuasca*» *Journal of Ethnopharmacology* 10(2): 195–223.

McKenna, D.J. *et al.* 1984B. «Monoamine oxidase inhibitors in South American hallucinogenic plants Part 2: Constituents of orally-active myristicaceous hallucinogens» *Journal of Ethnopharmacology* 12(2): 179–211.

McKenna, D.J. *et al.* 1995. «Biodynamic constituents in ayahuasca admixture plants: An uninvestigated folk pharmacopeia» In: R.E. Schultes and S. von Reis (Eds.) *Ethno-*

botany: Evolution of a Discipline. Dioscorides Press, Portland, OR, pp. 349–361.

McLeod, W.R. and **B.R. Sitaram** 1985. «Bufotenine reconsidered» *Acta Psychiatrica Scandinavica* 72: 447–450. [Bonhour *et al.* 1967]

MacRae, E. 1992. *Guiado pela lua: Xamanismo e uso ritual da ayahuasca no culto do Santo Daime*. Ed. Brasiliense, São Paulo, Brasil.

MacRae, W.D. 1984. *Ethnobiological and Chemical Investigations on Selected Amazonian Plants*. Thesis, UBC, Vancouver, BC, Canada. [*Dissertation Abstracts* 45(12): 3704–B]

MacRae, W.D. and **G.H.N. Towers** 1984A. «An ethnopharmacological examination of *Virola elongata* bark: A South American arrow poison» *Journal of Ethnopharmacology* 12(1): 75–92. [*vide*: Galeffi *et al.* 1983]

MacRae, W.D. and **G.H.N. Towers** 1984B. «*Justicia pectoralis*: A study of the basis for its use as a hallucinogenic snuff ingredient» *Journal of Ethnopharmacology* 12(1): 93–111. [*vide item*: Schultes 1979,1990]

Marini-Bettòlo, G.B. *et al.* 1964. «Sulla sostanze allucinogene dell'Amazzonia. Nota II. Osservazioni sul'epena degli Yanoáma del bacino del Río Negro e dell'Alto Orinoco» *Annali di Chimica* 54: 1179–1186.

Marks, J. 1979. *The Search for the «Manchurian Candidate»: The* CIA *and Mind Control*. Times Books, New York, NY. [*et* Lee 1992]

Martindale, W. 1886. *Coca, Cocaine and its Salts*... H.K. Lewis, London, England.

Martínez-Crovetto, R. 1968. «Estado actual de las tribus mocovíes del Chaco (República Argentina)» *Etnobiológica* 7: 1–23.

Maxwell, N. 1990. *Witch-Doctor's Apprentice*. Citadel, New York, NY. [Orig. 1961]

Meckes-Lozoya, M. *et al.* 1990. «N,N-Dimethyltryptamine alkaloid in *Mimosa-tenuiflora* bark (tepescohuite)» *Archivos de Investigación Médica* 21(2): 175–177.

Métraux, A. 1946. «Ethnography of the Chaco» In: J.H. Steward [Ed.] *Handbook of South American Indians* Volume 1: 197–370. Smithsonian Institution, Washington, DC.

Métraux, A. 1948. «Tribes of the middle and upper Amazon River» In: J.H. Steward [Ed.] *Handbook of South American Indians* 3: 687–712. Smithsonian Institution, Washington, DC. [*vide item*: Ducke 1938,1939]

Milton, K. 1994. «No pain, no game» *Natural History*. September issue, pp. 44–51.

Moerman, D.E. 1998. *Native American Ethnobotany*. Timber Press, Portland, OR.

Monardes, N. 1990. *Herbolaria de Índias*. Commentary by X. Lozoya. Redacta, México, DF. [Original edition in 1569, Sevilla]

Morgan, G.R. 1980. «The ethnobotany of sweet flag among North American Indians» *Botanical Museum Leaflets* Harvard University 28(3): 235–246. [*vide item*: Motley 1994]

Morgan, G.R. 1981. ««Sugar bowls» (*Clematis hirsutissima*): A horse restorative of the Nez Perce» *Journal of Ethnopharmacology* 4(1): 117–120. [*vide*: Kern & Cardellina 1983]

Motley, T.J. 1994. «The ethnobotany of sweet flag, *Acorus calamus* (Araceæ)» *Economic Botany* 48(4): 397–412. [*vide*: Morgan 1980]

Müller-Ebeling, C. *et al.* 2000. *Schamanismus und Tantra in Nepal*. AT Verlag, Aarau.

Nadkarni, A.K. 1976. *Dr. K.M. Nadkarni's Indian Materia Medica*. Popular Prakashan, Bombay [presently Mumbai], India.

Naranjo, P. 1979. «Hallucinogenic plant use and related indigenous belief systems in the Ecuadorian Amazon» *Journal of Ethnopharmacology* 1(2): 121–145. [*ibid.*, 1983,1986]

Naranjo, P. 1983. *Ayahuasca: Etnomedicina y mitología*. Libri Mundi, Quito, Ecuador.

Naranjo, P. 1986. «El *ayahuasca* en la arqueología ecuatoriana» *América Indígena* 46(1): 117–127. [Schultes, *Ethnobotany*, 393, 1995]

Navarro, J. 1992. *Historia natural o jardín americano*. UNAM/IMSS/ISSSTE, México, DF. [Original 1801; *vide item*: Las Casas 1909]

Neher, R.T. 1965. *Monograph of the Genus Tagetes (Compositæ)*. Thesis, University of Indiana, Bloomington, IN. [*vide* Lipp 1991]

Neuwinger, H.D. 1996. *African Ethnobotany: Poisons and Drugs*. Chapman & Hall, London, England. [German original 1994]

Oblitas Poblete, E. 1992. *Plantas medicinales en Bolivia: Farmacopea callawaya*. Editorial Los Amigos del Libro, La Paz, Bolivia.

Ortíz de Montellano, B.R. 1990. *Aztec Medicine, Health, and Nutrition*. The Rutgers University Press, New Brunswick, NJ.

Ott, J. 1978. «Recreational use of hallucinogenic mushrooms in the United States» In: B.H. Rumack and E. Salzman (Eds.) *Mushroom Poisoning: Diagnosis and Treatment*. CRC Press, W. Palm Beach, FL, pp. 231–243.

Ott, J. 1985. *The Cacahuatl Eater: Ruminations of an Unabashed Chocolate Addict*. Natural Products Company, Vashon, WA.

Ott, J. 1995A. «Ethnopharmacognosy and human pharmacology of *Salvia divinorum* and salvinorin A» *Curare: Zeitschrift für Ethnomedizin* 18(1): 103–129. [*vide* Wasson 1962]

Ott, J. 1995B. *The Age of Entheogens and the Angels' Dictionary*. Natural Products Company, Vashon, WA. [*vide item*: Dally 1995]

Ott, J. 1995C. «*Cebíl* in San Pedro de Atacama». Unpublished psychonautic bioassays.

Ott, J. 1996. *Pharmacotheon: Entheogenic Drugs, their Plant Sources and History*. Natural Products Company, Kennewick, WA. Introduction by A. Hofmann. [Original, 1993]

Ott, J. 1997. *Pharmacophilia or The Natural Paradises*. Natural Products Company, Kennewick, WA. [Castillian 1998, Phantastica]

Ott, J. 1998. «The Delphic Bee: Bees and toxic honeys as pointers to psychoactive and other medicinal plants» *Economic Botany* 52(3): 260–266. [*vide item*: Wilbert 1996]

Ott, J. 1999A. «Pharmahuasca: Human pharmacology of oral DMT plus harmine» *Journal of Psychoactive Drugs* 31(2): 171–177.

Ott, J. 1999B. *Análogos de la Ayahuasca: Enteógenos pangéicos*. Phantastica, Barcelona, Catalunya, Espanya. Trans. J. Ott; second edition densified. [English original, 1994]

Ott, J. 2001A. «Pharmañopo-psychonautics: Human intranasal, sublingual, intrarectal, pulmonary and oral pharmacology of bufotenine» *Journal of Psychoactive Drugs*, in press. [Part II; for Part I, *vide*: Ott 1999A]

Ott, J. 2001B. «Pharmepéna-psychonautics: Human intranasal, sublingual and oral pharmacology of 5-methoxy-N,N-dimethyltryptamine» *Journal of Psychoactive Drugs*, in press. [Part I: Ott 1999A; *et* Part II: 2001A]

Ott, J. 2001C. «Pharmambíl-psychonautics: Human intranasal, sublingual and pulmonary pharmacology of nicotine» *Journal of Psychoactive Drugs*, in press. [I: Ott 1999A]

Oviedo y Valdés, G.F. 1944. *Historia general y natural de las Índias, islas y tierra firme del mar océano*. Editorial Guaranía, Asunción, Paraguay. [Original ms., *circa* 1520–1533]

Pachter, I.J. *et al.* 1959. «Indole alkaloids of *Acer saccharinum* (the silver maple), *Dictyoloma incanescens*, *Piptadenia colubrina*, and *Mimosa hostilis*» *Journal of Organic Chemistry* 24: 1285–1287. [Meckes-Lozoya 1990]

Pagés Larraya, F. 1959. «La cultura del paricá» *Acta Neuropsiquiátrica Argentina* 5: 375–383. [*vide item*: Wassén & Holmstedt 1963]

Pal, D.C. and **S.K. Jain** 1989. «Notes on Lodha medicine in Midnapur District, West Bengal, India» *Economic Botany* 43(4): 464–470.

Palevecino, E. 1979. «The magic world of the Mataco [*sic*]» *Latin American Indigenous Literatures* 3(2): 61–75. [*vide*: Dasso 1985]

Pané, R. 1974. *Relación acerca de las antigüedades de los índios*. J.J. Arrom, Ed. Siglo Veintiuno, México, DF. [Original in 1571]

Pardal, R. 1936. «Las drogas estupefacientes [*sic*] e ilusiógenas [*sic*] del indio americano» *Revista Geográfica Americana* 3(34): 1–21.

Pardal, R. 1937. *Medicina aborigen americana*. José Anesi, Buenos Aires, Argentina.

Paris, A. *et al.* 1967. «Sur les alcaloïdes et les flavonoïdes d'une Légumineuse d'Haïti: *Piptadenia peregrina* Benth. Absence d'alcaloïdes chez le *Piptadenia africana* Hook.

f.» *Annales Pharmaceutiques Françaises* 25 (7-8): 509–513. [*vide*: Schultes *et al.* 1977B]
Paynal, N. and **C. Sosa** [Eds.] 1993. *Mundos amazónicos: Pueblos y culturas de la Amazônia ecuatoriana.* Fundación Sinchi Sacha, Quito, Ecuador. [*vide*: Luna 1984]
Pérez de Tolosa, A. 1548. Cited in: P. Simon 1627. *Primera parte de las noticias historiales de las conquistas de tierra firme en las Índias Occidentales.* Quinta Noticia Historial, Cuenca, Ecuador. [Vázquez de Espinosa 1942]
Pérez Gollán, J.A. and **I. Gordillo** 1994. «Vilca/Uturuncu: Hacia una arqueología del uso de alucinógenos en las sociedades prehispánicas de los Andes del sur» *Cuicuilco* 1(4): 99–140. [*vide*: Larrain Barros 1976]
Perrine, D.M. 1996. *The Chemistry of Mind-Altering Drugs.* American Chemical Society, Washington, DC. [*vide*: Shulgin, 1997]
Pinkley, H.V. 1969. «Plant admixtures to *ayahuasca*, the South American hallucinogenic drink» *Lloydia* 32(3): 305–314.
Plotkin, M.J. 1993A. «Blood of the moon, semen of the sun» *Shaman's Drum* 32: 32–41.
Plotkin, M.J. 1993B. *Tales of a Shaman's Apprentice: An Ethnobotanist Searches for New Medicines in the Amazon Rain Forest.* Viking Penguin, New York, NY. [*ibid.*, 1993A]
Plotkin, M.J. and **R.E. Schultes** 1990. «*Virola*: A promising genus for ethnopharmacological investigation» *Journal of Psychoactive Drugs* 22(3): 357–361. [Gottlieb 1979]
Plotkin, M.J. *et al.* 1980. «Psychotomimetic use of tobacco in Surinam and French Guiana» *Journal of Ethnopharmacology* 2(3): 295–297. [*vide* Sharon 1979; Wilbert 1987]
Plowman, T.C. 1980. «Chamairo: *Mussatia hyacinthina*—An admixture to coca from Amazonian Perú and Bolivia» *Botanical Museum Leaflets* Harvard University 28(3): 253–261. [Davis 1983; Oblitas Pobl. 1992]
Plowman, T.C. 1981. «Amazonian coca» *Journal of Ethnopharmacology* 3(2&3): 195–225.
Pochettino, M.L. *et al.* 1999. «Hallucinogenic snuff from northwestern Argentina: Microscopical identification of *Anadenanthera colubrina* var. *cebil* (Fabaceæ) in powdered archæological material» *Economic Botany* 53(2): 127–132. [*vide item* Torres *et al.* 1991]
Polari de Alverga, A. 1999. *Forest of Visions: Ayahuasca, Amazonian Spirituality, and the Santo Daime Tradition.* Translation, R. Workman. Park Street Press, Rochester, VT.
Polia Meconi, M. 1996. *«Despierta, remedio, cuenta...»: Adivinos y médicos del Ande.* Pontificia Universidad Católica del Perú, Lima, Perú. [Joralemon & Sharon 1993]
Polo de Ondegardo, J. 1916. «Informaciones acerca de la religión y gobierno de las incas» In: H.H. Urteaga [Ed.] *Colección de libros y documentos referentes a la historia del Perú.* Lima, Perú, 3: 29–30. [Original 1571]
Poma de Ayala, F.G. 1969. *Nueva crónica y buen gobierno.* Casa de la Cultura del Perú, Lima, Perú. [Original ms., *circa* 1614]
Prance, G.T. 1970. «Notes on the use of plant hallucinogens in Amazonian Brazil» *Economic Botany* 24(1): 62–68. [Plowm. 1981]
Prance, G.T. 1972. «Ethnobotanical notes from Amazonian Brazil» *Economic Botany* 26(3): 221–237. [*vide item*: *ibid.* 1977,1978]
Prance, G.T. 1978. «The poisons and narcotics of the Dení, Paumarí, Jamamadí and Jarawara Indians of the Purús river region» *Revista Brasileira da Botânica* 1: 71–82.
Prance, G.T. *et al.* 1977. «The ethnobotany of the Paumarí Indians» *Economic Botany* 31 (2): 129–139. [*vide item*: *ibid.* 1972,1978]
Prescott, W.H. 1847. *History of the Conquest of Perú, with a Preliminary View of the Civilization of the Incas.* Harper & Bros., New York, NY. [*vide*: Cobo 1956; Wassén 1967]
Rätsch, C. 1987. «Der Rauch von Delphi: Eine ethnopharmakologische Annäherung» *Curare: Zeitschrift für Ethnomedizin* 10: 215–228. [*vide*: Ott 1998; Rätsch 1996B]
Rätsch, C. 1995. *Heilkräuter der Antike in Ägypten, Griechenland und Rom.* Eugen Diederichs Verlag, München, Deutschland [BRD].
Rätsch, C. 1996A. «Eine Erfahrung mit dem Mataco-Schnupfpulver *Hataj*» *Jahrbuch für Ethnomedizin und Bewußtseinsforschung* 5: 59–65. [Torres 1996B; T. & Repke 1996]
Rätsch, C. 1996B. *Räucherstoffe: Der Atem des Drachens.* AT Verlag, Aarau, Schweiz.
Rätsch, C. 1996C. *Urbock: Bier jenseits von Hopfen und Malz.* AT Verlag, Aarau, Schweiz.
Rätsch, C. 1998A. *Enzyklopädie der psychoaktiven Pflanzen.* AT Verlag, Aarau, Schweiz.
Rätsch, C. 1998B. *Hanf als Heilmittel: Ethnomedizin, Anwendung und Rezepte.* AT Verlag, Aarau, Schweiz. [Original ed. in 1992]
Raymond-Hamet, M. 1956. «Some physiological properties of a remarkable South American stimulant: *Piptadenia peregrina*» *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences* 243: 512–514. [Fish 1955]
Reagan, A.B. 1929. «Plants used by the White Mountain Apache Indians of Arizona» *Wisconsin Archæologist* 8: 143–161. [Adams 1990]
Reclus, P. 1903. *L'Anesthésie localisée par la cocaïne.* Masson et Cie, Édit. Paris, France.
Reichel-Dolmatoff, G. 1971. *Amazonian Cosmos: The Sexual and Religious Symbolism of the Tukano Indians.* University of Chicago Press, Chicago, IL. [*et* 1975,1996A,1996B]
Reichel-Dolmatoff, G. 1975. *The Shaman and the Jaguar: A Study of Narcotic* [*sic*] *Drugs Among the Indians of Colombia.* Temple University Press, Philadelphia, PA. Foreword by Richard E. Schultes, pp. xi–xiv.
Reichel-Dolmatoff, G. 1996A. *Yurupari: Studies of an Amazonian Foundation Myth.* Harvard University Press, Cambridge, MA.
Reichel-Dolmatoff, G. 1996B. *The Forest Within: The World-View of the Tukano Amazonian Indians.* Themis Books, Totnes, Devon, England. [*vide item*: *ibid.* 1971,1975,1996A]
Reid, J.W. 1986. *Textile Masterpieces of Ancient Perú.* Dover Publications, New York, NY.
Reinburg, P. 1921. «Contribution a l'étude des boissons toxiques des indiens du nord-ouest de l'Amazone, l'ayahuásca–le yajé–le huánto» *Journal de la Société des Américanistes* 13: 25–54. [being 1er, 2e et 3e Parties]
Reko, B.P. 1919. «De los nombres botánicos aztecas» *El México Antiguo* 1(5): 113–157 [J. Ott, 1996 trans., VWB, Berlin, Deutsch.].
Reko, V.A. 1936. *Magische Gifte: Rausch- und Betäubungsmittel der neuen Welt.* F. Enke Verlag, Stuttgart, Deutschland. [repr., 1987]
Remington, J.P. 1894. *The Practice of Pharmacy. A Treatise...* J.B. Lippincott Co., Philadelphia, PA. [Third edition, original 1885]
Rendón P., W.J. 1985. «Obtención de la bufotenina de la semilla de Piptadenia macrocarpa Benth» *Revista Boliviana de Química* 5(1): 39–43. [cited as: Rendón & Willy]
Rivier, L. 1981. «Analysis of alkaloids in leaves of cultivated *Erythroxylum* and characterization of alkaline substances used during coca chewing» *Journal of Ethnopharmacology* 3(2&3): 313–335. [*et* Plowman 1981]
Rivier, L. and **J.-E. Lindgren** 1972. ««Ayahuasca», the South American hallucinogenic drink: An ethnobotanical and chemical investigation» *Economic Botany* 26(1): 101–129.
Robbins, W.W. *et al.* 1916. *Ethnobotany of the Tewa Indians.* Bureau of American Ethnology Bulletin 55. Smithsonian Institution, Washington, DC. [*vide* Adams 1990]
Rovinski, J.M. *et al.* 1987. «Maquiroside A, a new cytotoxic cardiac glycoside from *Maquira calophylla*» *Journal of Natural Products* 50(2): 211–216. [*et* De Carvalho 1997]
Russo, E. 1992. «Headache treatments by native peoples of the Ecuadorian Amazon: A preliminary, cross-disciplinary assessment» *Journal of Ethnopharmacology* 36(3): 193–206.
Russo, E. 1999. «Veterinary hunting magic treatments of the Machiguenga tribe or, the canine conundrum». Unpublished ms.
Rutter, R.A. 1990. *Catálogo de plantas útiles de la Amazônia peruana.* Instituto Lingüístico de Verano, Yarinacocha, Perú.
Saar, M. 1991. «Fungi in Khanty folk medi-

cine» *Journal of Ethnopharmacology* 31(2): 175–179. [*vide item* Saar, M. 31(2): 157–173]
Safford, W.S. 1916. «Identification of cohoba, the narcotic snuff of ancient Haiti» *Journal of the Washington Academy of Sciences* 6: 547–562. [*et* Fish 1955; Torres 1988,1998]
Sahagún, B. de 1950-1969. *Florentine Codex: General History of the Things of New Spain by Fray Bernardino de Sahagún*. Translated from the Náhuatl in 13 Vols. by C.E. Dibble and A.J.O. Anderson. University of Utah Press, Salt Lake City, UT. [Original ms 1569]
Saint Laurent, C. 1999. Personal communications, telephone and San Francisco, CA.
Salathé, G. 1931. «Les indiens Karimé» *Revista del Instituto de Etnología de la Universidad Nacional de Tucumán* 2(1): 297–316.
Samorini, G. 1996. «Un ciceone africano?» *Eleusis* 4: 40–41. [*vide*: Hargreaves 1986]
Sávio Nunes, D. *et al.* 1987. «Alcalóides triptamínicos de *Piptadenia gonoacantha* (Mart) Macbr e de *Anadenanthera falcata* (Benth) Speg». [Apparently an unpublished ms.]
Schele, L. and **M.E. Miller** 1986. *The Blood of Kings: Dynasty and Ritual in Mayan Art*. George Braziller, Incorp., New York, NY.
Schmeda-Hirschmann, G. 1993. «Magic and medicinal plants of the Ayoreos of the Chaco Boreal (Paraguay)» *Journal of Ethnopharmacology* 39(2): 105–111. [*vide*: Lipp 1995]
Schobinger, J. 1997. «El arte rupestre del area andina como expresión de ritos y vivencias shamánicas [*sic*] o iniciáticas» In: J. Schobinger [Ed.] *Shamanismo* [*sic*] *sudamericano*. Editorial Almagesto, Buenos Aires, Argentina, pp. 45–67. [*et* Fernández 1980]
Schomburgk, R. 1848. *Reisen in Britisch-Guiana in den Jahren 1840–1844*. Zweiter Theil. J.J. Weber, Leipzig, Deutschland.
Schroeder, D.R. 1986[5]. «Isolation and biomimetic synthesis of bishordeninyl terpene alkaloids from *Zanthoxylum procerum*» [*ex*: *Dissertation Abstracts* 47(2): 636–B].
Schultes, R.E. 1945. «El uso del tabaco entre los huitotos» *Agricultura Tropical* 1(9): 19–22.
Schultes, R.E. 1954. «A new narcotic [*sic*] snuff from the northwest Amazon» *Botanical Museum Leaflets* Harvard University 16(9): 241–260. [*vide* Ducke 1938,1939]
Schultes, R.E. 1957. «The genus *Quararibea* and the use of its flowers as a spice in chocolate» *Botanical Museum Leaflets* Harvard University 17(9): 247–264. [Wassén 1979]
Schultes, R.E. 1967. «The botanical origins of South American snuffs» In: D.H. Efron *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs*. US Government Printing Office, Washington, DC, pp. 291–306.
Schultes, R.E. 1969. «De plantis toxicariis e mundo novo tropicale commentationes V. *Virola* as an orally administered hallucinogen» *Botanical Museum Leaflets* Harvard University 22(6): 229–240. [1976,1977A]
Schultes, R.E. 1972. «De plantis toxicariis e mundo novo tropicale commentationes X. New data on the malpighiaceous narcotics of South America» *Botanical Museum Leaflets* Harvard University 23(3): 137–147.
Schultes, R.E. 1978. «Evolution of the identification of the major South American narcotic plants» *Botanical Museum Leaflets* Harvard University 26(9-10): 311–357.
Schultes, R.E. 1979. «Evolution of the identification of the myristicaceous hallucinogens of South America» *Journal of Ethnopharmacology* 1(3): 211–239. [& Holm. 1968]
Schultes, R.E. 1980A. «De plantis toxicariis e mundo novo tropicale commentationes XXVI. Ethnopharmacological notes on the flora of northwestern South America» *Botanical Museum Leaflets* Harvard University 28(1): 1–45. [*vide ibid.* 1945; Wilbert 1987]
Schultes, R.E. 1980B. «De plantis toxicariis e mundo novo tropicale commentationes XXIX. A suspected new Amazonian hallucinogen» *Botanical Museum Leaflets* Harvard University 28(3): 271–275. [Schultes 1985A]
Schultes, R.E. 1981. «Coca in the northwest Amazon» *Journal of Ethnopharmacology* 3 (2&3): 173–194. [*et* BMLHU 28(1): 47–60]
Schultes, R.E. 1983A. «De plantis toxicariis e mundo novo tropicale commentationes XXXII. Notes, primarily of field tests and native nomenclature, on biodynamic plants of the northwest Amazon» *Botanical Museum Leaflets* Harvard University 29(3): 251–272.
Schultes, R.E. 1983B. «De plantis toxicariis e mundo novo tropicale commentationes XXXIII. Ethnobotanical, floristic and nomenclatural notes on plants of the northwest Amazon» *Botanical Museum Leaflets* Harvard University 29(4): 343–365.
Schultes, R.E. 1984. «Fifteen years of study of psychoactive snuffs of South America: 1967–1982—A review» *Journal of Ethnopharmacology* 11(1): 17–32. [Schultes 1977]
Schultes, R.E. 1985A. «De plantis toxicariis e mundo novo tropicale commentationes XXXIV: Biodynamic rubiaceous plants of the northwest Amazon» *Journal of Ethnopharmacology* 14(2,3): 105–124. [*ibid.* 1980B]
Schultes, R.E. 1985B. «De plantis toxicariis e mundo novo tropicale commentationes XXXV. Miscellaneous notes on biodynamic plants of the northwest Amazon» *Journal of Ethnopharmacology* 14(2,3): 125–158.
Schultes, R.E. 1985C. «De plantis toxicariis e mundo novo tropicale commentationes XXXVI. A novel method of utilizing the hallucinogenic Banisteriopsis» *Botanical Museum Leaflets* Harvard University 30(3): 61–63. [Schultes 1990 was also NO. XXXVI]
Schultes, R.E. 1986. «De plantis toxicariis e mundo novo tropicale commentationes XXXVII. Miscellaneous notes on medicinal and toxic plants of the northwest Amazon» *Botanical Museum Leaflets* Harvard University 30(4): 255–285. [*vide*: Plowman 1981]
Schultes, R.E. 1987. «A caffeine drink prepared from bark» *Economic Botany* 41(4): 526–527. [*vide*: Calella 1945; Wilbert 1987]
Schultes, R.E. 1988. *Where the Gods Reign: Plants and Peoples of the Colombian Amazon*. Synergetic Press, Oracle, AZ. [*et* 1992]
Schultes, R.E. 1990. «De plantis toxicariis e mundo novo tropicale commentationes XXXVI. *Justicia* (Acanthaceæ) as a source of an hallucinogenic snuff» *Economic Botany* 44(1): 61–70. [Schultes 1985C = NO. XXXVI]
Schultes, R.E. and **N.R. Farnsworth** 1980. «Ethnomedicinal, botanical and phytochemical aspects of natural hallucinogens» *Botanical Museum Leaflets* Harvard University 28(2): 123–214. [Sch. & Hofmann 1980]
Schultes, R.E. and **A. Hofmann** 1980. *The Botany and Chemistry of Hallucinogens*. C.C. Thomas, Springfield, IL. [Original, 1973]
Schultes, R.E. and **B.R. Holmstedt** 1968. «De plantis toxicariis e mundo novo tropicale commentationes II. The vegetal ingredients of the myristicaceous snuffs of the northwest Amazon» *Rhodora* 70: 113–160. [*et* 1971]
Schultes, R.E. and **B.R. Holmstedt** 1971. «De plantis toxicariis e mundo novo tropicale commentationes VIII. Miscellaneous notes on myristicaceous plants of South America» *Lloydia* 34(1): 61–78. [*vide*: *ibid.*, 1968]
Schultes, R.E. and **R.F. Raffauf** 1990. *The Healing Forest: Medicinal and Toxic Plants of the Northwest Amazonia*. Dioscorides Press, Portland, OR. Introduction by H.R.H. Philip.
Schultes, R.E. and **R.F. Raffauf** 1992. *Vine of the Soul: Medicine Men, Their Plants and Rituals in the Colombian Amazon*. Synergetic Press, Oracle, AZ. Introduc. by G.T. Prance.
Schultes, R.E. and **T. Swain** 1976. «De plantis toxicariis e mundo novo tropicale commentationes XIII. Further notes on Virola as an orally administered hallucinogen» *Journal of Psychedelic Drugs* 8(4): 317–324.
Schultes, R.E. *et al.* 1977A. «De plantis toxicariis e mundo novo tropicale commentationes XVII. *Virola* as an oral hallucinogen among the Boras of Peru» *Botanical Museum Leaflets* Harvard University 25(9): 259–266; includes PLATES 55–60, pp. 267–272.

Schultes, R.E. *et al.* 1977B. «De plantis toxicariis e mundo novo tropicale commentationes XVIII. Phytochemical examination of Spruce's ethnobotanical collection of *Anadenanthera peregrina*» *Botanical Museum Leaflets* Harvard University 25(10): 273–287.

Seitz, G. 1965. «Einige Bemerkungen zur Anwendung und Wirkungsweise des *Epena*-Schnupfpulver der *Waika*-Indianern» *Göteborgs Etnografiska Museet Etnologiska Studier* 28: 117–132. [*vide*: Holmstedt 1965]

Seitz, G. 1967. «Epéna, the intoxicating snuff powder of the Waika Indians and the Tucano medicine man, Agostino» In: D.H. Efron *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs.* US Government Printing Office, Washington, DC, pp. 315–338.

Seitz, G. 1969. «Die Waikas und ihre Drogen» *Zeitschrift für Ethnologie* 94: 266–283.

Serrano, A. 1934. «El uso de tabaco y vegetales narcotizantes [*sic*] entre los indígenas de América» *Revista Geográfica Americana* 2(15): 415–429. [Schul. 1945; Wilbert 1987]

Sharon, D. 1978. *Wizard of the Four Winds: A Shaman's Story.* Free Press, New York, NY.

Sharon, D. 1979. «A Peruvian *curandero*'s séance: Power and balance» In: D.L. Browman and R.L. Schwarz (Eds.) *Spirits, Shamans, and Stars: Perspectives from South America.* Mouton Publishers, den Haag, Nederland, pp. 223–232. [*vide*: Calderón 1982]

Shepard, Jr., G.H. 1998. «Psychoactive plants and ethnopsychiatric [*sic*] medicines of the Matsigenka» *Journal of Psychoactive Drugs* 30(4): 321–332. [Kamen-Kaye 1971,1975]

Shrestha, T. *et al.* 1992. «The Moraceæ-based dart poisons of South America. Cardiac glycosides of *Maquira* and *Naucleopsis* species» *Journal of Ethnopharmacology* 37(2): 129–143.

Shulgin, A.T. 1976. «Profiles of psychedelic drugs. I. DMT» *Journal of Psychedelic Drugs* 8(2): 167–168. [*vide item*: TIHKAL NO. 6]

Shulgin, A.T. 1981. «Profiles of psychedelic drugs. II. Bufotenine» *Journal of Psychoactive Drugs* 13(4): 389. [*vide* TIHKAL NO. 19]

Shulgin, A.T. and **A. Shulgin** 1997. TIHKAL: *The Continuation.* Transform Press, Berkeley, CA. Introduction by D.M. Perrine.

Siegel, R.K. *et al.* 1977. «On the use of *Tagetes lucida* and *Nicotiana rustica* as a Huichol smoking mixture: The Aztec «Yahutli» with suggestive hallucinogenic effects» *Economic Botany* 31(1): 16–23. [*et* Neher 1965]

Siméon, R. 1997. *Diccionario de la lengua náhuatl o mexicana.* Trans. J. Oliva de Coll. Siglo Veintiuno, México, DF. [Original 1885]

Smith, N.J.H. *et al.* 1992. *Tropical Forests and their Crops.* Comstock Publishing Associates, Ithaca, NY. [*vide item*: Young 1994]

Snethlage, E.H. 1937. *Atiko y. Meine Erlebniße bei den Indianern des Guaporé.* Berlin, Deutschland. [Wassén & Holmstedt 1963]

Soares Maia, J.G. and **W.A. Rodrigues** 1974. «*Virola theiodora* como alucinógena» *Acta Amazónica* 4(1): 21–23. [*vide*: Schultes 1954]

Sotelo Narváez, P. 1885. «*Relación de las provincias de Tucumán...*» *Relaciones Geográficas de Índias, Perú.* Tomo II. Ministro de Fomento, Madrid, España. [Orig., 1583]

Speeter, M.E. and **W.C. Anthony** 1954. «The action of oxalyl chloride on indoles: A new approach to tryptamines» *Journal of the American Chemical Society* 76: 6208–6210.

Spruce, R. [A.R. Wallace, Ed.] 1908. *Notes of a Botanist on the Amazon and Andes.* Two vols. Macmillan, London, England. Reprint 1970; Johnson Reprint, New York, NY.

Stagno d'Alcontres, G. and **G. Cuzzocrea** 1957. «Sui principi attivi dello *ñopo*» *Atti della Società Peloritana* 3(2): 167–177. [error?]

Stoll, A. *et al.* 1955. «Eine neue Synthese von Bufotenin und verwandten Oxy-tryptaminen» *Helvetica Chimica Acta* 38(6): 1452–1472.

Stromberg, V.L 1954. «The isolation of bufotenine from *Piptadenia peregrina*» *Journal of the American Chemical Society* 76: 1707.

Sturtevant, W.C. 1955. *The Mikasuki Seminole: Medical Beliefs and Practices.* Doctoral Thesis, Yale University, New Haven, CT.

Sullivan, T.D. *et al.* [Trans. and Eds.] 1997. *Primeros Memoriales by Fray Bernardino de Sahagún: Paleography of Náhuatl Text and English Translation.* University of Oklahoma Press, Norman, OK. [*et* Facsimile: 1993]

Taylor, K.I. 1979. «Body and spirit among the Sanumá (Yanoama) of North Brazil» In: D.L. Browman and R.A. Schwarz [Eds.] *Spirits, Shamans, and Stars: Perspectives from South America.* Mouton Publishers, den Haag, Nederland, pp. 201–221. [*vide*: Prance 1970]

Teixeira da Fonseca, E. 1922. *Indicador de madeiras e plantas uteis do Brasil.* Publication details unknown. [*vide*: Schultes 1954]

Thevet, A. 1955. *Les singularités de la France Antarctique, autrement nommée Amérique.* Christophle Plantin, Antwerpen, Belgie.

Toad 1999. «DPT primer» *The Entheogen Review* 8(1): 4–6. [*vide*: Case, Gwyllm 1999]

Torres, C.M. 1981. «Evidence for snuffing in the prehispanic stone sculpture of San Agustín, Colombia» *Journal of Psychoactive Drugs* 13(1): 53–60. [*vide*: Uscátegui 1959]

Torres, C.M. 1987A. *The Iconography of South American Snuff Trays. Göteborgs Etnografiska Museet Etnologiska Studier* 37: 1–134, 193 plates, unpaginated. [Wassén 1967]

Torres, C.M. 1987B. «The iconography of prehispanic snuff trays from San Pedro de Atacama, northern Chile» *Andean Past* 1: 191–245. [*vide*: Torres 1987A; Wassén 1967]

Torres, C.M. 1988. «El arte de los taíno» In: *Taíno: Los descubridores de Colón.* Museo Chileno de Arte Precolombino, Santiago, Chile.

Torres, C.M. 1993. «Snuff trails of Atacama: Psychedelics and iconography in prehispanic San Pedro de Atacama» *Integration: Zeitschrift für Geistbewegende Pflanzen und Kultur* 4: 17–28. [*vide*: Torres *et al.* 1991]

Torres, C.M. 1995. «Camélidos y enteógenos en la arqueología de San Pedro de Atacama, norte de Chile» In: J.M. Fericgla [Ed.] *Actas II Congreso para el Estudio de los Estados Modificados de la Consciencia.* Institut de Prospectiva Antropològica, Barcelona, Catalunya, Espanya, pp. 37–38. [Torres 1987A]

Torres, C.M. 1996A. «Polveri da fiuto allucinogene nel Cile precolombiano» *Altrove* 3: 29–39. [*vide*: Torres 1987A,1987B,1993,1995]

Torres, C.M. 1996B. «Status of research on psychoactive snuff powders: A review of the literature» *Jahrbuch für Ethnomedizin und Bewußtseinsforschung* 5: 15–39. [& Repke]

Torres, C.M. 1998. «The role of *cohoba* in Taíno shamanism» *Eleusis*, n.s. 1: 38–50.

Torres, C.M. and **D.B. Repke** 1996. «The use of *Anadenanthera colubrina* var. *Cebil* by Wichi (Mataco) shamans of the Chaco Central, Argentina» *Jahrbuch für Ethnomedizin und Bewußtseinsforschung* 5: 41–58. [*et* 2000]

Torres, C.M. and **D.B. Repke** 2000. *Anadenanthera: Shamanic Inebriant of Ancient South America.* U. of New México, Albuquerque.

Torres, C.M. *et al.* 1991. «Snuff powders from pre-Hispanic San Pedro de Atacama: Chemical and contextual analysis» *Current Anthropology* 32(5): 640–649. [*et* Torres 1993]

Turner, N.J. *et al.* 1990. *Thompson Ethnobotany. Knowledge and Usage of Plants by the Thompson Indians of British Columbia.* [Memoir No. 3] Royal British Columbia Museum, Victoria, BC, Canada. [*vide* Ott 1978]

Turner, W.J. and **S. Merlis** 1959. «Effect of some indolealkylamines on man» *Archives of Neurology and Psychiatry* 81: 121–129.

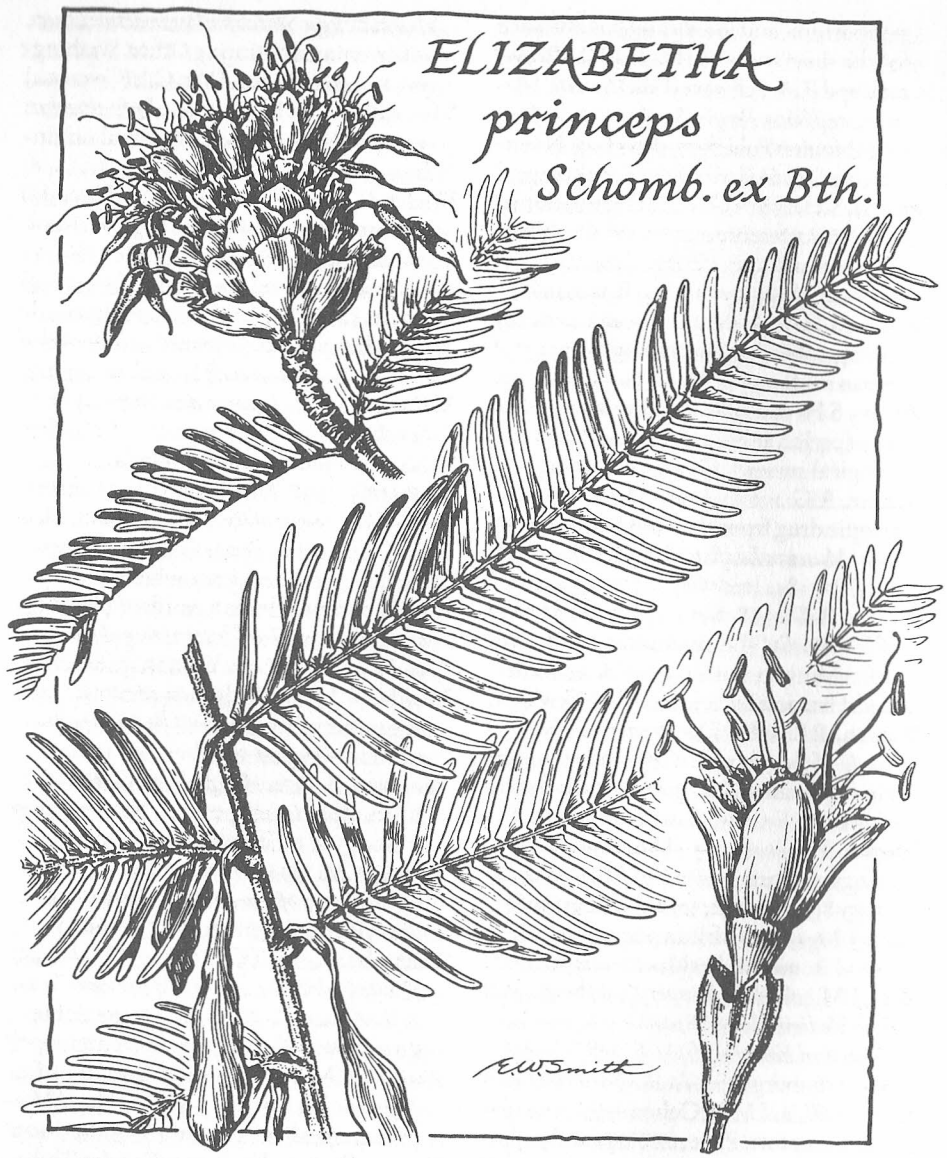
Ueno, A. *et al.* 1964. «Studies on the compounds of *Phæolus schweinitzii* (Fr.) Pat.» *Chemical and Pharmacological Bulletin* 12: 376.

Uhle, M. 1898. «A snuffing tube from Tiahuanaco» *Bulletin of the Museum of Science and Art* 1(4). University of Pennsylvania, Philadelphia, PA. [*vide item*: Cobo 1956]

Uphof, J.C.Th. 1968. *Dictionary of Economic Plants.* Verlag von J. Cramer, Lehre, Deut.

Urbina, F. 1992. *Las hojas del poder: Relatos sobre la coca entre los uitotos y muinanes de la Amazônia colombiana.* Universidad Nac-

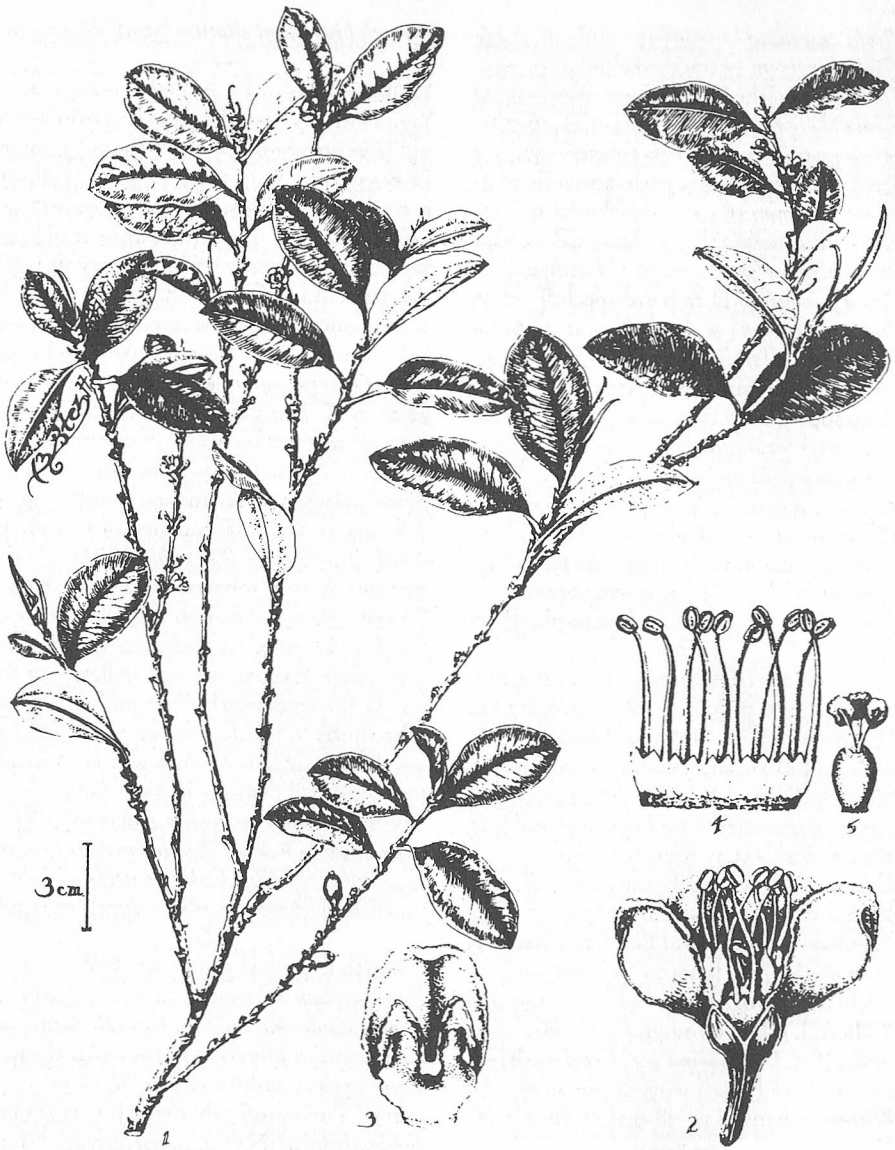
ional de Colombia, SF de Bogotá, Colombia.
Uscátegui M., N. 1959. «The present distribution of narcotics and stimulants amongst the Indian tribes of Colombia» *Botanical Museum Leaflets* Harvard University 18(6): 273–304. [*vide*: Schultes 1945; Torres 1981]
Van Allen Murphy, E. 1990. *Indian Uses of Native Plants*. Meyerbooks Publishers, Glenwood, IL. [Orig., 1958; Bean & Saubel 1972]
Van den Berg, N.E. 1993. *Plantas medicinais na Amazônia*. Museu Paraense Emílio Goeldi, Belém, Pará, Brasil. [*et* Da Mota 1987]
Van der Merwe, N.J. 1975. «*Cannabis* smoking in 13TH–14TH century Ethiopia: Chemical evidence» In: V. Rubin (Ed.) *Cannabis and Culture*. Mouton Publishers, den Haag, Nederland, pp. 77–80. [*vide*: Hambly 1930]
Van Gils, C. and **P.A. Cox** 1994. «Ethnobotany of nutmeg in the Spice Islands» *Journal of Ethnopharmacology* 42(2): 117–124.
Van Wyk, B.-E. *et al.* 1997. *Medicinal Plants of South Africa*. Briza Publications, Prætoria, South Africa. [*vide*: Neuwinger 1996]
Vázquez de Espinosa, A. 1942. *Description of the Indies*. Smithsonian Miscellaneous Collections, Vol. 102, Smithsonian Institution, Washington, DC. [*et* Pérez de Tolosa 1548]
Vetancurt, A. de 1982. *Teatro mexicano: Descripción breve de los sucesos ejemplares, históricos y religiosos del nuevo mundo de las Índias*. Editorial Porrúa, México, DF. [Original 1697–1698; *vide*: Sahagún 1950–1969]
Vickers, W.T. and **T.C. Plowman** 1984. «Useful plants of the Siona and Secoya Indians of eastern Ecuador» *Fieldiana* 15: 1–63.
Voeks, R.A. 1997. *Sacred Leaves of Candomblé: African Magic, Medicine, and Religion in Brazil*. University of Texas Press, Austin, TX.
Von Humboldt, A. and **A. Bonpland** 1819. *Voyage aux régions équinoxiales du nouveau continent...* Éd. F. Schoell, Paris, France.
Von Reis Altschul, S. 1964. «A taxonomic study of the genus Anadenanthera» *Contributions from the Gray Herbarium of Harvard University* 193: 1–65, Cambridge, MA.
Von Reis Altschul, S. 1967. «Vilca and its use» In: Efron, D.H. *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs*. US Government Printing Office, Washington, DC, pp. 307–314. [Pérez Gollán & Gord. 1994]
Von Reis Altschul, S. 1972. *The Genus Anadenanthera in Amerindian Cultures*. Botanical Museum of Harvard University, Cambridge, MA. [*vide*: Torres & Repke 2000]
Von Reis Altschul, S. 1973. *Drugs and Foods from Little-Known Plants: Notes in Harvard University Herbaria*. Harvard University Press, Cambridge, MA. [*ibid.* & Lipp 1982]
Von Reis Altschul, S. and **F.J. Lipp, Jr.** 1982. *New Plant Sources for Drugs and Foods from the New York Botanical Garden Herbarium*. Harvard University Press, Cambridge, MA.
Von Spix, J.B. and **C.P. Martius** 1831. *Reise in Brasilien*. Band 3. Lindnauer, München, Deutschland. [*vide* von Reis Altschul 1972]
Wassel, G.M. *et al.* 1985. «Alkaloids from the rhizomes of *Phragmites australis* (Cav.) Trin. ex Steud.» *Scientia Pharmaceutica* 53(3): 169–170. [*Chemical Abstracts* 104: 48723F]
Wassén, S.H. 1964. «Some general viewpoints in the study of native drugs especially from the West Indies and South America» *Ethnos* 29(1-2): 97–120. [*et* Torres 1998]
Wassén, S.H. 1965. «The use of some specific kinds of South American Indian snuff and related paraphernalia» *Göteborgs Etnografiska Museet Etnologiska Studier* 28: 1–116.
Wassén, S.H. 1967. «Anthropological survey of the use of South American snuffs» In: Efron, D.H. *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs*. US Government Printing Office, Washington, DC, pp. 233–289. [Wassén & Holmstedt 1963]
Wassén, S.H. 1972. «A medicine-man's implements and plants in a Tiahuanacoid tomb in highland Bolivia» *Göteborgs Etnografiska Museet Etnologiska Studier* 32: 8–14. [*et* 1965]
Wassén, S.H. 1979. «Was *espingo* (*ispincu*) of psychotropic and intoxicating importance for the shamans in Perú?» In: D.L. Browman and R.A. Schwarz (Eds.) *Spirits, Shamans, and Stars: Perspectives from South America*. Mouton Publishers, den Haag, Nederland, pp. 55–62. [*vide item*: Schultes 1957]
Wassén, S.H. 1981. «Un documento colonial brasileño referente a un envio de objetos para aspirar rapé» *Scripta Ethnologica* 6: 167–172. [*vide*: De Smet & Rivier 1987]
Wassén, S.H. 1995. «Some important, mainly ethnographic data concerning the usage of Indian snuffs» *Acta Americana* 3(2): 24–42.
Wassén, S.H. and **B.R. Holmstedt** 1963. «The use of paricá, an ethnological and pharmacological review» *Ethnos* 28(1): 5–45.
Wasson, R.G. 1962. «A new Mexican psychotropic drug from the mint family» *Botanical Museum Leaflets* Harvard University 20(3): 77–84. [*vide item*: Ott 1995A,1996]
Wasson, R.G. 1968. *Soma: Divine Mushroom of Immortality*. [Ethno-mycological Studies NO. 1] Mouton and Co., den Haag, Nederland; Harcourt Brace Jovanovich, New York.
Watson, P.L. 1983. *The Precious Foliage: A Study of the Aboriginal Psychoactive Drug* Pituri [Oceania Monograph 60]. University of Sydney, Sydney, Australia. [*ibid.*, 1983]
Watson, P.L. *et al.* 1983. «The ethnopharmacology of pituri» *Journal of Ethnopharmacology* 8(3): 303–311. [*vide*: Wilbert 1987]
Watt, J.M. 1967. «African plants potentially useful in mental health» *Lloydia* 30: 1–22.
Watt, J.M. and **M.G. Breyer-Brandwijk** 1962. *The Medicinal and Poisonous Plants of Southern and Eastern Africa*. E. & S. Livingstone, Edinburgh, Scotland. [Van Wyk 1997]
Watts, S.W. and **M.L. Cohen** 1999. «Vascular 5-HT receptors: Pharmacology and pathophysiology of 5-HT_{1B}, 5-HT_{1D}, 5-HT_{1F}, 5-HT_{2B} and 5-HT_7 receptors» *Neurotransmissions* (SIGMA/RBI newsl.) 15(4):3–15. [*et* Cerenex 1993]
Weil, A.T. 1967. «Nutmeg as a psychoactive drug» In: Efron, D.H. *et al.* (Eds.) *Ethnopharmacologic Search for Psychoactive Drugs*. US Government Printing Office, Washington, DC, pp. 188–201. [Van Gils/Cox 1994]
Weil, A.T. and **W. Davis** 1994. «*Bufo alvarius*: A potent hallucinogen of animal origin» *Journal of Ethnopharmacology* 41(1,2): 1–8.
Wieland, T. and **W. Motzel** 1953. «Über das Vorkommen von Bufotenin in gelben Knollenblätterpilz» *Justus Liebig's Annalen der Chemie* 581: 10–16. [*vide*: Stromberg 1954]
Wilbert, J. 1958. «Datos antropológicos de los indios piaroa» *Memorial de la Sociedad de Ciencias Naturales de La Salle* 18: 155–183.
Wilbert, J. 1987. *Tobacco and Shamanism in South America*. Yale University Press, New Haven, CT and London, England.
Wilbert, J. 1996. *Mindful of Famine: Religious Climatology of the Warao Indians*. Harvard University Press, Cambridge, MA.
Williams, J. 1930. «Christopher Columbus and aboriginal Indian words» *Proceedings of the Twenty-Third International Congress of Americanists*. New York, NY, p. 833 *et seq.*
Wurdack, J.J. 1958. «Indian narcotics [*sic*] in southern Venezuela» *The Garden Journal*. July–August number, pp. 116–119.
Yamasato, S. 1972. «Organic bases from Brazilian *Piptadenia* species» *Phytochemistry* 11(2): 737–739. [Iacobucci & Rúveda 1964]
Young, A.M. 1994. *The Chocolate Tree: A Natural History of Cacao*. Smithsonian Institution Press, Washington, DC. [Smith 1992]
Yungjohann, J.C. [G.T. Prance, Ed.] 1989. *White Gold: The Diary of a Rubber Cutter in the Amazon*. 1906–1916. Synergetic Press, Oracle, AZ. [Biocca 1996; Chagnon 1992]
Zardini, E.M. 1977. «The identification of an Argentinian narcotic [*sic*]» *Botanical Museum Leaflets* Harvard Univ. 25(3): 105–107.
Zerries, O. 1955. «Das Lasha-Fest der Waika-Indianer» *Die Umschau* 55(21): 662–665.
Zerries, O. 1960. «Medizinmannwesen und Geisterglaube der Waika-Indianer des oberen Orinoko» *Ethnologica*, N.F. 2: 487–507.



Elizabetha princeps SCHOMB. ex BENTH. [Leguminosæ], E.W. Smith, the Waiká *ama-asita*-tree, the source of bark-ash for *epéna/ebene* [*Virola*] visionary snuff-powders.

Do you imagine, oh, lean-hearted member of the Anti-Snuff and Tobacco Club, that the dark apostle standing before us will preach with less power, less unction, less persuasive eloquence, because he snuffs over the psalm book, and smokes in the vestry between the forenoon and afternoon service? Does his piety ooze through his pipe, or his earnestness end in smoke?

Mordecai Cubitt Cooke
The Seven Sisters of Sleep [1860]



Erythroxylum coca LAM. var. *ipadu* PLOWMAN [Erythroxylaceæ],
L.T. Bates, *ipadú* or «Amazonian *coca*», used as
a food, stimulating masticatory, snuff- and *ayahuasca*-admixture.

What can a friar give you
However much he loves you,
A bit of tobacco-snuff
And a eulogy when you die?

Anonymous
Chuchumbé lyrics, Veracruz [18TH C.]

I am beholden to Dr. C. Manuel Torres, of *Florida International University* in Miami (la Florida), for inviting me to collaborate with his long-term investigations on South American shamanic snuffs, for his invaluable bibliographic assistance and for his having kindly reviewed this manuscript. I am likewise indebted to Dr. Robert Montgomery, of *Botanical Preservation Corps* in Sebastopól (Alta California Norte), for lending me his considerable expertise as reviewer. I thank Iris van den Hurk and Menno Bergman, of *Pharmacophilia,* V.O.F. in Amsterdam, for their heroic assistance with bioassays; and Boris Crary of Tokyo, Japan, for the sample of *oo-koó-he Virola* resin. I also declare my sincere appreciation to Prof. Bo R. Holmstedt, of *Karolinska Institutet* in Stockholm, for his providing me with numerous recondite bibliographic sources—it is my pleasure to dedicate this, my opuscule, to this great pioneer in the phytochemical analysis of divers shamanic snuffs and kindred visionary inebriants.

As always, I acknowledge my continuing debt to my three mentors: the late Dr. R. Gordon Wasson, of Danbury, Connecticut; Dr. Richard Evans Schultes, of *Harvard University* in Cambridge; and Dr. Albert Hofmann, of Basel, Switzerland. I am ever more inspired by their pioneering research in entheobotany and ethnopharmacognosy—more constant, true and brilliant cynosures one could not wish to have.

I would be remiss should I fail to thank Dr. Felix Martín, of Coatepéc, Veracruz, for his repeated assistance, as mentally stimulating as it proved to be indispensable.

My hyperpnean hierobotany I dedicate to Hallie M. Greene; she, in halation halcyon; hathoric hamadryad of the tangled tresses and so tender heart… you, Hallie, of the all-melting beauty bounteous and beatific; so handsome and heart-harbored you, my mellifluous Muse…

JONATHAN OTT
PALENQUE, CHIAPAS
WINTER 2001